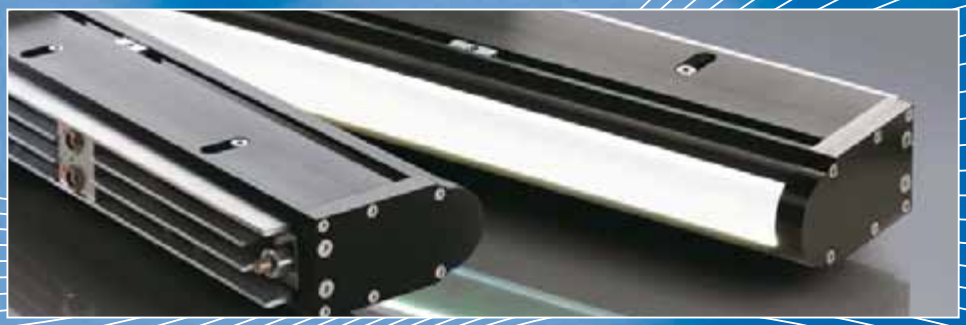
MV
Machine Vision General Catalog

Illumination Vol.001



MORITEX SCHOTT

Unparalleled Expertise

Machine Vision Systems combine lighting, imaging, and data processing to inspect, monitor, and control industrial production processes. They have been employed in a variety of industries on a multitude of applications.

As experts in providing Lighting and Imaging solutions for today's vast machine vision market, MORITEX and SCHOTT offer standard and customized solutions for illumination, lens design, and front end optical systems.

With decades of experience, and extensive know-how, MORITEX and SCHOTT can provide the total machine vision illumination and imaging solution designed exclusively for you comprised from our vast product portfolio.

MORITEX and SCHOTT are leading global suppliers of illumination and imaging components for machine vision applications. Our unparalleled expertise in these areas makes us uniquely qualified to service all different levels from system design to integrated lighting and imaging system solutions. Please review the products featured in this catalog and let us know how we can best serve you!

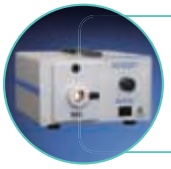
Fiber Optic Light Sources and Light Guides

ColdVision Series

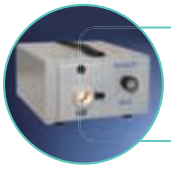
The ColdVision series provides an extensive offering of light sources, fiber optic light guides, and accessories designed to meet every illumination need for Machine Vision and Microscopy illumination.

Utilizing LED, Halogen and Xenon light sources and accessories for standard and customized solutions, the ColdVision series combines flexibility with versatility. All ColdVision products in the expansive portfolio are specifically designed to operate seamlessly together and represent your best choice for Machine Vision and Microscopy illumination world-wide.

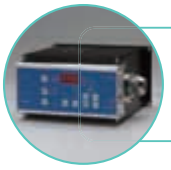
LED Light Source
LLS



Halogen Light Source
DCR® III
DCR® III Plus
DCR® IV



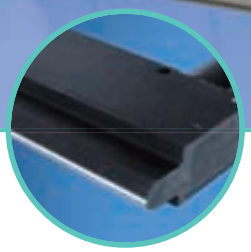
Halogen Light Source
ACE®



Xenon Flash Light Source
MaVi-S

Universal Ringlight
Midi and Mini Ringlights
66 mm / 58 mm Ringlights
Darkfield Ringlight
Single Bundles
Dual and Quad Bundles
Randomized and Calibrated Bundles
Single and Dual Goosenecks
Combination Goosenecks & Bundles
1", 2" & 3" Lightlines
Lightlines
Spatially Randomized Lightlines
45° Lightline
Lightline Lenses
Single and Dual Backlights
PANELite® Backlights

Darkfield Illuminator / Ringlight Adapters
Ringlight Polarizers & Analyzers
Diffuse Dome
Ringlight Reflector Rings / Ringlight Support Apparatus
Bundle Extenders
Gooseneck & Bundle Support Apparatus
Support Apparatus
Filters, Diffusers & Spot Lenses
Lightline Linear Polarizer Kits
Lightlines Support Apparatus



- CE Marking
- UL Listed
- CSA Marking
- RoHS Directive
- 75 W Wattage
- 150 W Wattage
- W (R/G/B) LED Color (Made-to-order Color)

W (R/G/B) RoHS CE

LLS - LED Light Source

LLS - LED Light Source, A20960

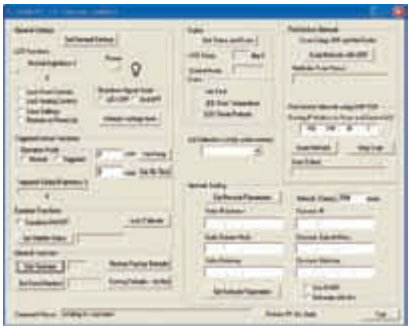
Long Life, Low Energy Consumption, High Performance

- Long life-time (50,000 hours)
- Fits all COLDVision light guides
- Fast triggered strobe capabilities (maximum 1 kHz pulse rate, maximum pulse width 1 msec, duty 1/10)
- Internal light feedback provides stabilized light output for the most demanding machine vision applicaitons.
- Low power consumption (less then 25 watts)
- Improved immunity to vibration and shock
- Small footprint and worldwide universally compatible power supply with interchangeable plugs
- RoHS compliant
- CE approved

LLS - LED Light Source, A20960. Rear View shows (from left to right): universal power input, multi-port input, Ethernet input, RS-232 input

Hybrid Solution pairs state-of-the-art LED technology with Fiber Optic Light Guides

- The LLS offers users 4 different modes of control interfaces - a continous intensity control knob, Ethernet, RS-232 or analog 0-5 Volt.
- The auto-sensing inputs eliminate the need to switch manually between the modes. The unit also features a user control lock-out via the Ethernet and RS-232 SCHOTT supplied software.

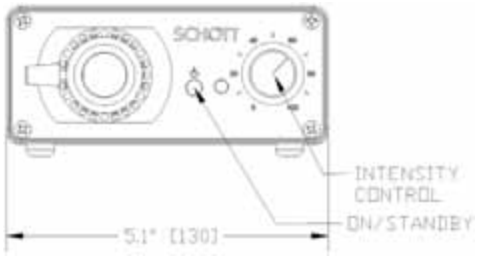


Screen shot of the supplied Ethernet software

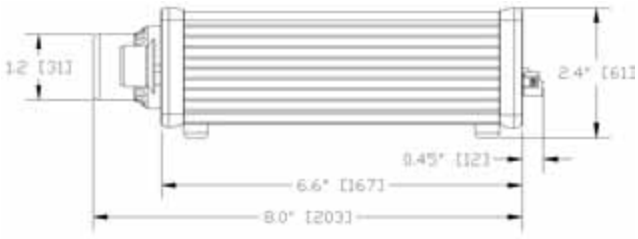
LLS - LED Light Source

Dimensions in ( ) are in mm

LLS A20960 Top View



Side View



Front View

Characteristics	
Dimensions	Length 197 mm (7.75 in)
	Width 129 mm (5.08 in)
	Height 63 mm (2.48 in)
Weight	862 grms (1.9 lbs)
Operating Temperature	5° C (41° F) to 40° C (104° F)
Color Temperature - White	6000K (Reference Values)

LLS Technical Information

Part No.	Color	Wavelength (nm) (+/- bandwidth 20 nm)	Light Output
★ A20960	Red	625	120 lm
A20960.1	White	---	275 lm
★ A20960.2	Green	525	100 lm
★ A20960.4	Blue	470	40 lm
★ A20955	Mounting Bracket		

★Made-to-order products.

Option

Nosepiece Adapter

Nosepiece Adapter

	Model
MORITEX Lightguides	LLS-LG-MTX
MegaLight	LLS-LG-MEGA

150 W CSA UL CE

DCR® III Light Source

DCR® III Light Source with EKE lamp, A20800

DC regulated light source provides intense, cool illumination

- DC-regulated light source limits light fluctuation to ± 0.5% due to line voltage variation
- Universal input voltage – accepts 90 to 265 VAC
- Current limiting – protects the unit from over heating due to defective andaging bulbs.
- Transient protection – allows remote location of bulb.
- Lamp change indicator light - LED located on front panel changes from green to red when lamp requires replacement.
- Soft start "lamp saver" circuitry
- IR filter for cool illumination
- Solid state dimmer control for continuous dimming
- Interchangeable Modulamp Units offer 2 lamp positions to maximize individual lamp efficiencies.
- Choice of three, 150 watt halogen lamps - EKE, EJA and DDL
- Can power the RS232 from the 9-pin connector
- Built-in 9-pin connector for analog remote control or RS-232 connection (A20601)
- Detachable IEC cord
- Quiet fan cooling
- CSA approved to UL spec, CE compliant to low voltage and EMC directives
- Low housing temp – slightly above ambient

DCR® III Light Source Models

Part No.	Description
Standard Light Sources with US Power Cord Included	
A20800	with EKE Lamp
A20800.1	with EJA Lamp
A20800.2	with DDL Lamp
Light Source without Modulamp Unit and US Power Cord Included	
★ **A20801**	No Lamp – Power Supply Only
Standard Light Sources EU Version - No Power Cord Included	
A20820	with EKELamp
A20820.2	with DDL Lamp

★ Made-to-order products.

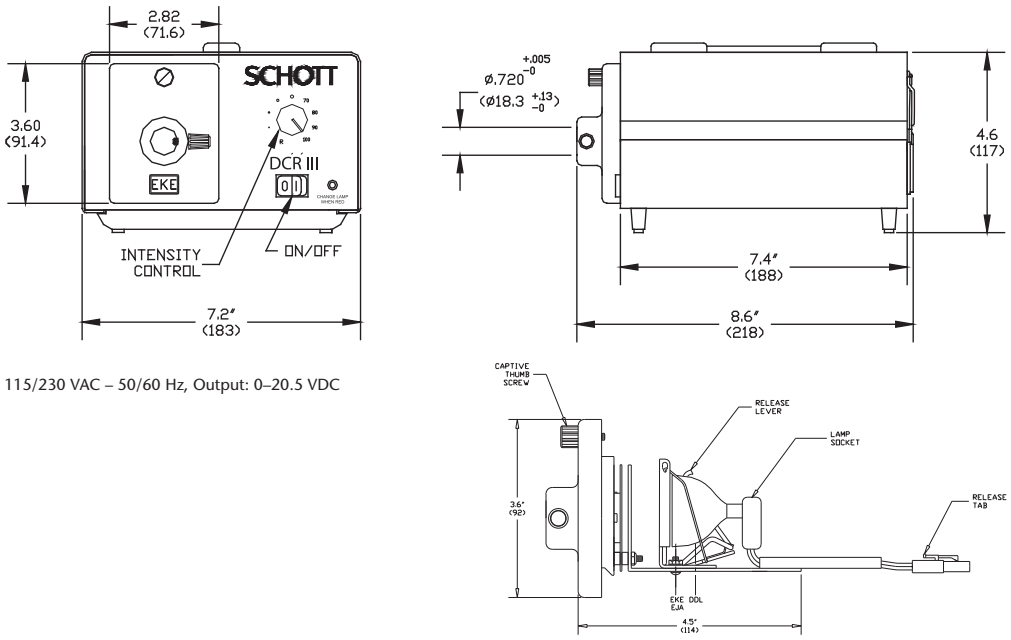
EKE, DDL, and EJA lamps and Modulamp units can be purchased separately.

Options

- Mechanical shutter.
- Wired, manual remote control andRS232 connection.
- Infinite setting, twelve blade irisdiaphragm version available to reduceintensity while maintaining color temperature.

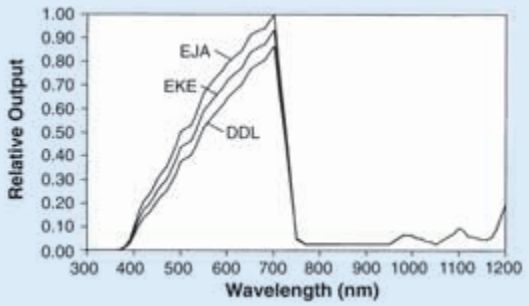
DCR® III Light Source

Dimensions in ( ) are in mm

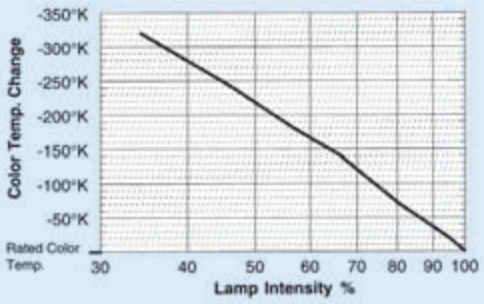


Input: 115/230 VAC – 50/60 Hz, Output: 0–20.5 VDC

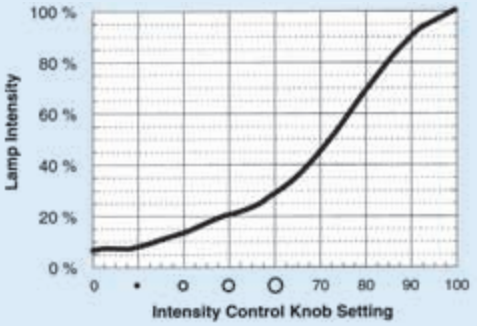
Spectral Curves w/Interference IR Filter



Color Temperature Change vs. Lamp Intensity



Lamp Intensity vs. Intersity Control Knob Setting



Modulamp... SCHOTT Innovation! Two positions optimize light intensity output, depending on the lamp in use. Entire housing is interchangeable for quick setup.

Choice of Lamps.. SCHOTT Versatility! Three different bulbs (EJA, EKE, DDL) offer light intensity and color temperature options to maximize productivity and accuracy.

Power Supply Specifications	
Rated Power Output	150 Watts
Output Voltage	0.0, 0.5 to 20.5 VDC
Input Voltage Rating, 50/60 Hz.	90 to 265 VAC
Power Factor Correction @ 230 VAC, 50 Hz.	> 0.99, < 4°
Hold-up Time, Nominal AC Input, Full Load	8.3 milliseconds
Line Regulation, Over Entire Input Range	±0.5%
Current Limit Set Point	8.5 Amps
Temperature Range:Operating	0° to 45°C
Storage	-25° to 85°C
Relative Humidity, Non-condensing	5% to 95%

Note: If the intensity control knob is turned to the R (Remote) position, lamp intensity control is switched to the rear 9-pin connector. Front panel intensity control will always override the remote intensity control.

150 W CSA UL CE

DCR® III Plus Light Source

DCR® III Plus Light Source , A20870

Includes all the standard features of the DCR® III plus a built-in RS232 interface providing intense, cool illumination via remote control

- Remote controllable using built-in integrated RS232 interface
- Designed to control up to three additional DCR® III units via a built-in 15-pin connector. Expansion cable and DCR® III light sources sold separately.
- Automatically restores user settings on power up
- Enhanced communications available by embedding error checking codes in command strings
- Easy programmability with simple command structure
- DC-regulated light source limits light fluctuation due to line voltage variation up to ±0.5%.
- Current limiting circuitry protects the unit from over heating due to defective and aging bulbs.
- Lamp change indicator light - LED located on front panel changes color from green to red when lamp requires replacement. Lamp status output on RS232 is available.
- Solid state intensity control adjusts from 0 to 100% light output.
- Interchangeable Modulamp units offer 2 lamp positions to maximize individual lamp efficiencies.
- Soft start "lamp saver" circuitry
- IR filter for cool illumination
- CSA certified to UL, CE compliant to low voltage and EMC directives
- Universal input voltage – accepts 90 to 265 VAC, 50/60 Hz

DCR® III Plus Light Source Models

Part No.	Description
Standard Light Sources US Power Cord Included	
A20870	with EKE Lamp
★ A20870.1	with EJA Lamp
A20870.2	with DDL Lamp
Standard Light Sources EU Version - No Power Cord Included	
A20875	with EKE Lamp
★ A20875.1	with EJA Lamp
A20875.2	with DDL Lamp
Expansion Cable	
A20665	Triple Cable with Plug, 12"

★ Made-to-order products.

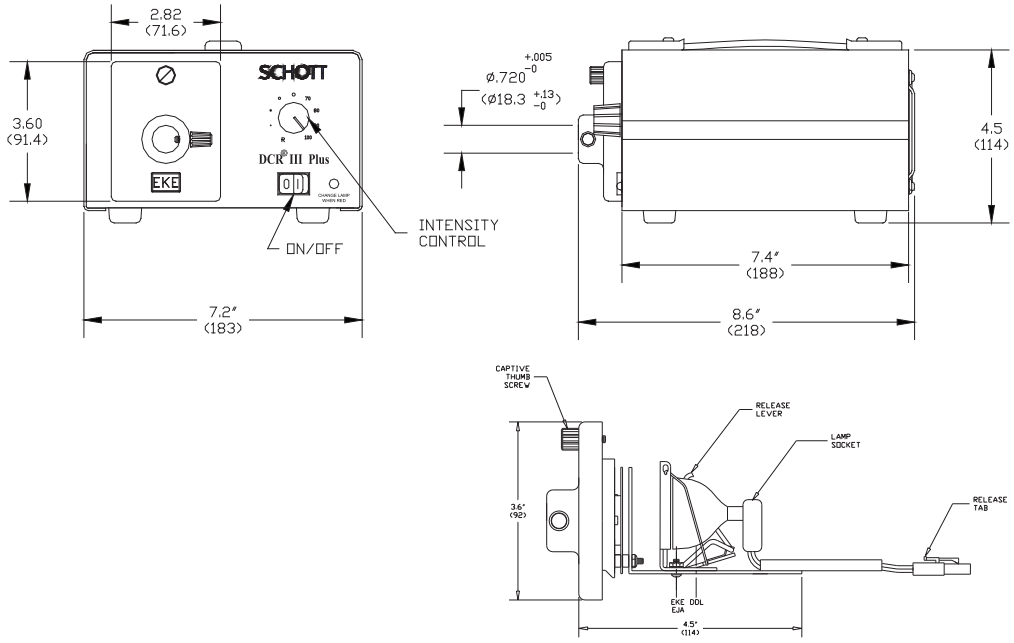
EKE, DDL, and EJA lamps and Modulamp units can be purchased separately.

Options

- Mechanical shutter.
- Infinite setting, twelve blade iris diaphragm version available to reduce intensity while maintaining color temperature.
- Expansion cable.
- Remote light source.

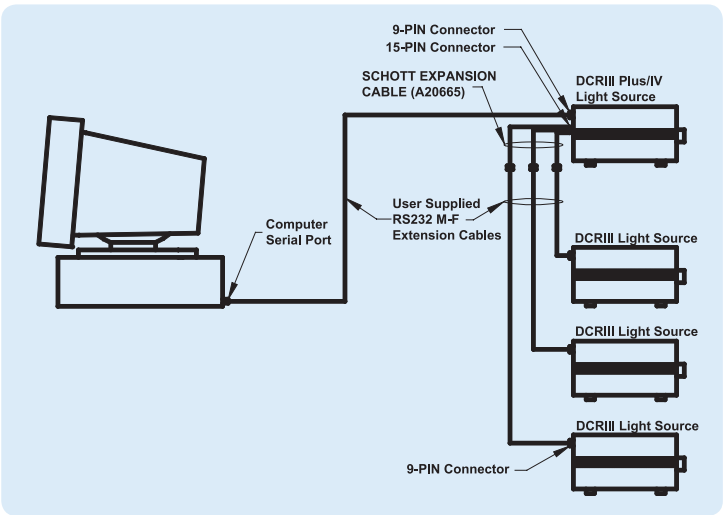
DCR® III Plus Light Source

Dimensions in ( ) are in mm



Modulamp... SCHOTT Innovation! Two positions optimize light intensity output, depending on the lamp in use. Entire housing is interchangeable for quick setup.

Choice of Lamps.. SCHOTT Versatility! Three different bulbs (EJA, EKE, DDL) offer light intensity and color temperature options to maximize productivity and accuracy.



Power Supply Specifications	
Rated Power Output	150 Watts
Output Voltage	0.0, 0.5 to 20.5 VDC
Input Voltage Rating, 50/60 Hz.	90 to 265 VAC
Power Factor Correction @ 230 VAC, 50 Hz.	> 0.99, < 4°
Hold-up Time, Nominal AC Input, Full Load	8.3 milliseconds
Line Regulation, Over Entire Input Range	±0.5%
Current Limit Set Point	8.5 Amps
Temperature Range: Operating	0° to 45°C
Storage	-25° to 85°C
Relative Humidity, Non-condensing	5% to 95%

Note: If the intensity control knob is turned to the R (Remote) position, lamp intensity control is switched to the RS232 interface. Front panel intensity control will always override the remote intensity control. Remote control of attached DCR® IIIs is dependent on each individual unit's setting, which should be in R (Remote) position for remote control.

150 W CSA UL CE

DCR® IV Light Source

DCR® IV Light Source with DDL lamp, A20890

DC regulated light source with integrated Equalizer light feedback to provide stabilized light output for the most demanding machine vision inspection applications (See DCR® III Plus datasheet for base description.)

- Stable lamp output over the life of the lamp and minimized lamp to lamp variation
- Remote controllable using integrated RS232 interface
- **Flexible** - Two configurations available:
- A. DCR® IV used with a reference Modulamp unit and off-the-shelf fiber optic, maintains DDL lamp output at ±2% over the life of the lamp and ±8% lamp to lamp
- B. For even greater control, use the DCR® IV with fiber optic products that have an integrated reference bundle; **special order only**. This will maintain DDL lamp output and lamp to lamp variation within ±1%.
- All of the features of the DCR® III Plus Light Source including control of up to three additional DCR® III light sources via an expansion cable
- LED's located on the front panel indicate that the lamp intensity is stabilized.
- Easy to use front panel controls for calibration and intensity control
- CSA certified to UL, CE compliant to low voltage and EMC directives
- Universal input voltage – accepts 90 to 265 VAC, 50/60 Hz

DCR® IV Light Source Models

Part No.	Description
Standard Light Sources US Power Cord Included	
★ **A20890**	Integrated Equalizer (complete with Reference Modulamp assembly and DDL Lamp). (Standard fiber)
★ **A20891**	Integrated Equalizer (complete with Modulamp assembly and DDL Lamp. Does not include reference bundle). (Custom Fiber)
Standard Light Sources EU Version - No Power Cord Included	
★ **A20895**	Integrated Equalizer (complete with Reference Modulamp assembly and DDL Lamp).

★ Made-to-order products.

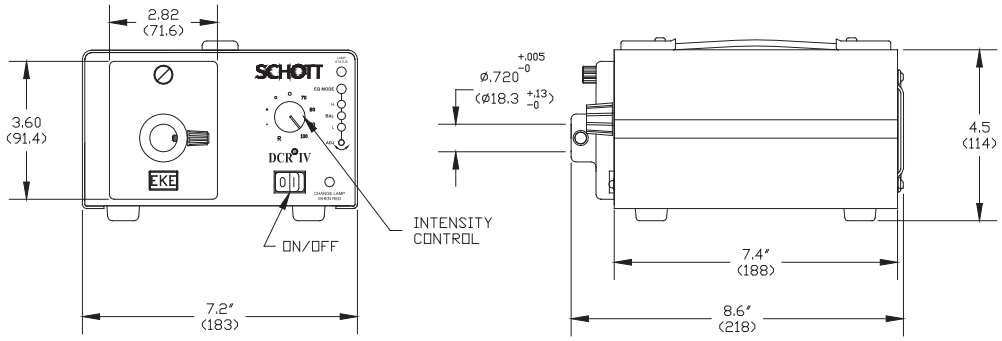
DDL lamp and Modulamp units can be purchased separately.

Options

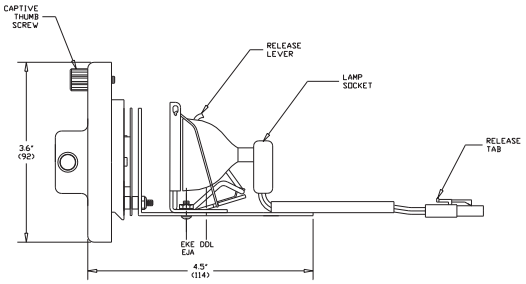
- Mechanical shutter.
- Infinite setting, twelve blade iris diaphragm unit available to reduce intensity while maintaining color temperature. Cannot be used with reference Modulamp.
- Expansion cable.

DCR® IV Light Source

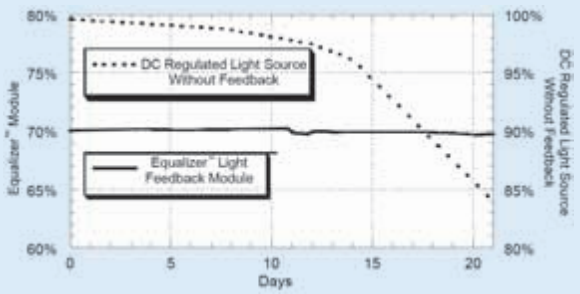
Dimensions in ( ) are in mm

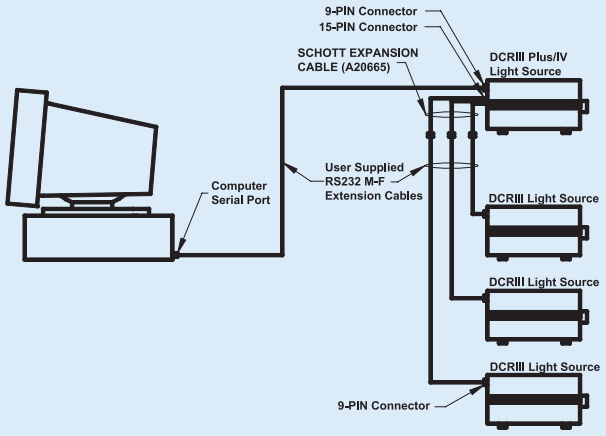


DDL lamp is offered as the standard lamp for this unit.



Lamp Intensity vs. Time





Note: If the intensity control knob is turned to the R (Remote) position, lamp intensity control is switched to the RS232 interface. Front panel intensity control will always override the remote intensity control. Remote control of attached DCR® IIIs is dependent on each individual unit's setting, which should be in R (Remote) position for remote control.

Performance Specifications	
Light Output with Reference Modulamp Unit	±2%
Light Output with Independent Reference Bundle	±1%
Lamp to Lamp Variation with Reference Modulamp Unit	±8%
Lamp to Lamp Variation with Independent Reference Bundle	±1%
Power Supply Specifications	
Rated Power Output	150 Watts
Output Voltage	0.0, 0.5 to 20.5 VDC
Input Voltage Rating, 50/60 Hz.	90 to 265 VAC
Power Factor Correction @ 230 VAC, 50 Hz.	> 0.99, < 4°
Hold-up Time, Nominal AC Input, Full Load	8.3 milliseconds
Line Regulation, Over Entire Input Range	±0.5%
Lamp Type	DDL, Ushio or GE, 150 W Halogen Bulb
Current Limit Set Point	8.5 Amps
Temperature Range: Operating	0° to 45°C
Storage	-25° to 85°C
Relative Humidity, Non-condensing	5% to 95%

CSA UL CE

Universal Light Source

Universal Light Source, A20855

For applications where DC power is already available and the need for an economical light source exists

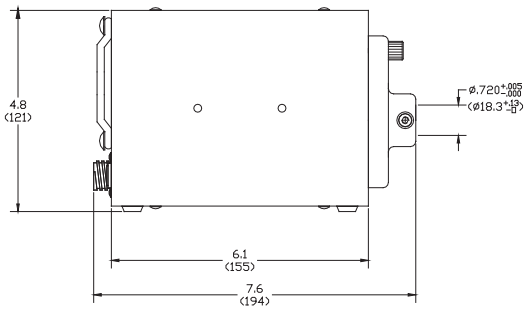
- Many of the same functional features as the Remote Light Source Kit
- Includes Modulamp
- Connectors are included.
- Power cable supplied by customer
- CE compliant to low voltage directive
- Will accept any MR-16 halogen lamp up to 150W/21V

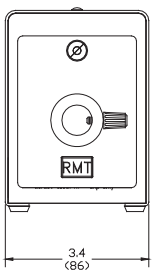
Light Source Accessories

Part No.	Description
A20855	Universal Light Source

A20855

Dimensions in ( ) are in mm





Input: 0 – 21 VDC

150 W CSA UL CE

ACE® Light Source

ACE® Light Source with EKE lamp, A20500

Compact, rugged, AC halogen light source with solid state dimmer for variable light intensity and maximizing lamp life

- Solid state dimmer for continuous control zero to full intensity
- Heavy duty, grounded metal housing
- 115 or 230 input voltage versions available
- IR interference filter for cool illumination
- Full illumination on .60" active diameter input
- Interchangeable Modulamp Units offer 2 positions to maximize individual lamp efficiencies.
- Choice of three, 150 watt halogen lamps - EKE, EJA, and DDL for intense, uniform illumination
- Built-in thermal shut down
- Quiet fan cooling
- CSA approved to UL spec, CE compliant to low voltage and EMC directives
- Low housing temperature
- Detachable IEC cord

Modulamp Unit with Iris Diaphragm

ACE® Light Source Models

115 Volt	230 Volt	Description
Standard Light Sources		
A20500	A20510	EKE Lamp
A20500.1	A20510.1	EJA Lamp
A20500.2	A20510.2	DDL Lamp
Light Source without Modulamp Unit		
★ A20500.115	★ A20510.230	No Lamp Power Supply Only

★ Made-to-order products.

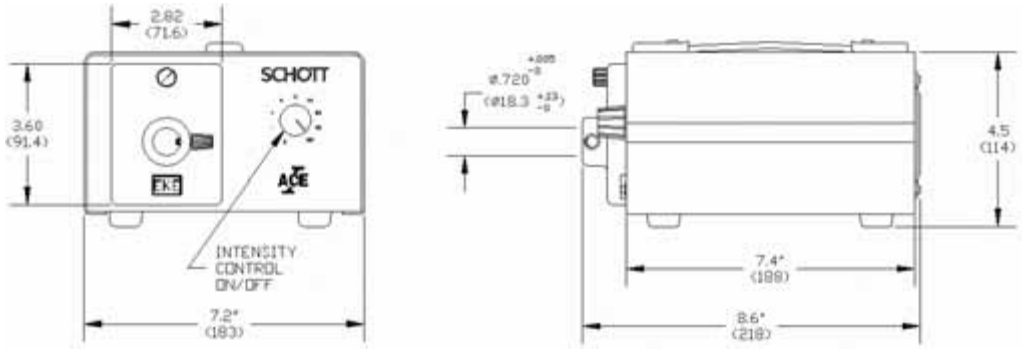
EKE, DDL, and EJA lamps and Modulamp units can be purchased separately.

Options

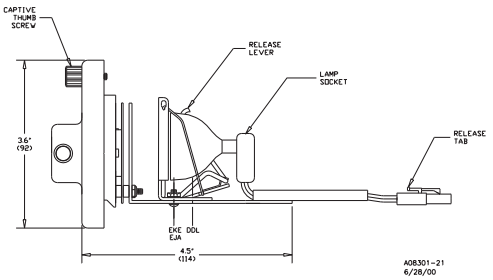
- Private labeling available.
- Infinite setting, twelve blade iris diaphragm version available to reduce intensity while maintaining color temperature.

ACE® Light Source

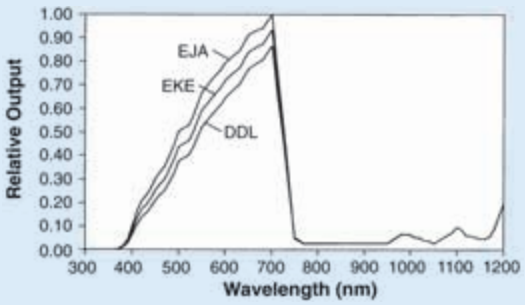
Dimensions in ( ) are in mm



Input: 115 VAC/60 Hz, 230 VAC/50/60 Hz, Output: 0–21 VAC



Spectral Curves w/Interference IR Filter

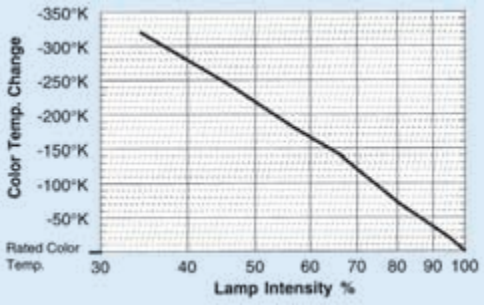


Modulamp... SCHOTT Innovation!
Two positions optimize light intensity output, depending on the lamp in use. Entire housing is interchangeable for quick setup.

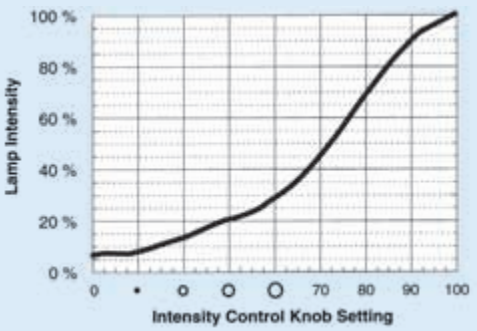
Choice of Lamps.. SCHOTT
Versatility! Three different bulbs (EJA, EKE, DDL) offer light intensity and color temperature options to maximize productivity and accuracy.

Power Supply Specifications	
Power Consumption	190 Watts (nominal)
Output Voltage	0 - 21 VAC
Fiber Receptacle	0.72" (13.3 mm)
Input Voltage	115 VAC / 60 Hz
	230 VAC / 50/60 Hz
Temperature Range: Operating	0° to 50°C

Color Temperature Change vs. Lamp Intensity



Lamp Intensity vs. Intersity Control Knob Setting



Solid State Dimmer..SCHOTT Control!
Continuous intensity control for lamp life management.

150 W CSA UL CE

ACE® Remote Light Source

115 Volt ACE® Remote Light Source with EKE lamp, A20560

All the features of our universally accepted ACE® light source with the added convenience of the following:

- 6' shielded black cable provides remote intensity control, including ON/OFF.
- Positive locking, quick disconnect cable will not pull out
- CSA approved to UL spec, CE compliant to low voltage and EMC directives
- 10' shielded extension available as an option
- Modulamp assembly purchased separately
- Heavy duty, grounded metal housing
- 115 input voltage version available
- IR interference filter for cool illumination
- Full illumination on .60" active diameter input
- Solid state dimmer control
- Interchangeable Modulamp Units offer 2 positions to maximize individual lamp efficiencies.
- Choice of three, 150 watt halogen lamps - EKE, EJA, and DDL for intense, uniform illumination
- Built-in thermal shut down
- Quiet fan cooling
- Zero to full intensity
- Low housing temperature
- Detachable IEC cord

10" Extension Cord with CPC connectors, A29505

ACE® Remote Light Source

ACE® Remote Power Supply	Modulamp/lamp not included
★ A20560.115	115 V Power Supply Only
Extension Cord	
A29505	10′ extension - CE and CSA Comp.

★ Made-to-order products.

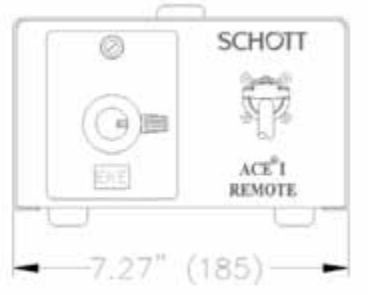
EKE, DDL, and EJA lamps and Modulamp units can be purchased separately.

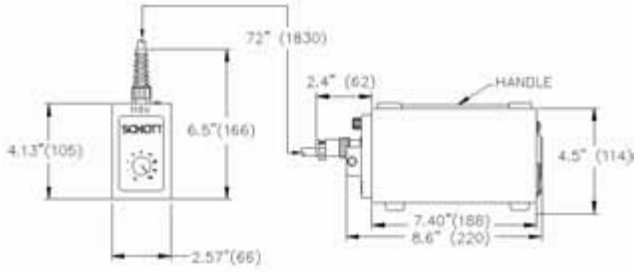
Options

- Infinite setting, twelve blade iris diaphragm version available to reduce intensity while maintaining color temperature.

ACE® Remote Light Source

Dimensions in ( ) are in mm





Input: 115 VAC/60 Hz, Output: 0–21 VAC shown with optional EKE modulamp sold separately.

Power Supply Specifications	
Power Consumption	190 Watts (nominal)
Output Voltage	0 - 21 VAC
Fiber Receptacle	0.72 (13.3)
Input Voltage	115 VAC / 60 Hz
Temperature Range: Operating	0° to 50°C

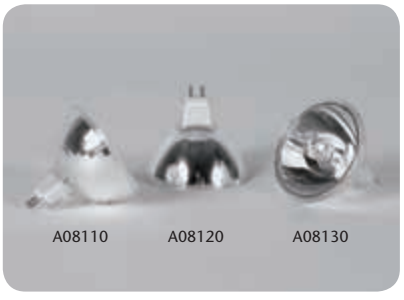
Halogen Lamps & Modulamp Assemblies

Lamp Features

- 150 watt tungsten halogen bulbs
- EJA, EKE and DDL types available
- Use with ACE® Series and DCR® Series light sources
- The correct lamp for your light source is specified on the label located on the front of the Modulamp unit.
- More specifications are in the chart on the left and on the back side of this page.

Modulamp Assembly Features

- Assures maximum light delivery to fiber optic components
- Use with all ACE® Series and DCR® Series light sources
- Full illumination on .60" (15 mm) active diameter input
- Interchangeable Modulamp units offer 2 lamp positions to maximize individual lamp efficiencies.
- Choice of three, 150 watt halogen lamps - EJA, EKE, DDL
- IR interference filter for cool illumination
- Iris version also available



EJA, EKE and DDL Lamps

Modulamp Assembly, A08301

Iris Diaphragm, A08321, A08321.1, A08321.2

150 Watt Halogen Lamps

Part No.	Type	Description
A08110	EJA	3350° K color temperature. 21 Volt. Most intense. Small spot size. Rated 40 hrs., 500 hrs. w/ a dimmer.*
A08120	EKE	3250° K color temperature. 21 Volt. High output for most applications. Rated 200 hrs., 2000 hrs. w/ a dimmer.*
A08130	DDL	3150° K color temperature. 20 Volt. Extremely uniform output. Rated 500 hrs., 5000 hrs. with a dimmer.*

*Voltage reduced to 80% of full intensity.

Modulamp Assemblies

Part No. Type	Description
Standard (without lamp)	
A08301	Lampholder for EKE Lamp
A08301.1	Lampholder for E J A Lamp
A08301.2	Lampholder for DDL Lamp
Iris Diaphragm (without lamp)	
A08321	Lampholder for EKE Lamp
A08321.1	Lampholder for E J A Lamp
A08321.2	Lampholder for DDL Lamp

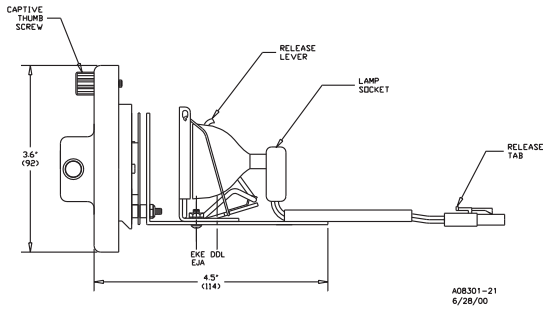
Lamp Socket

Lamp Socket

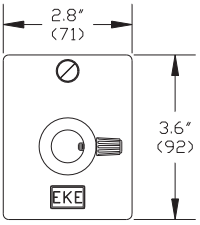
Part No.	Description
A29506	Lamp Socket for ACE® Series and DCR® Series light sources.

Halogen Lamps & Modulamp Assemblies

Dimensions in ( ) are in mm

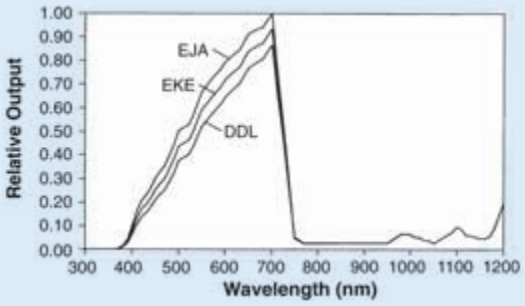


A08301, A08301.1 & A08301.2 - Modulamp Assemblies

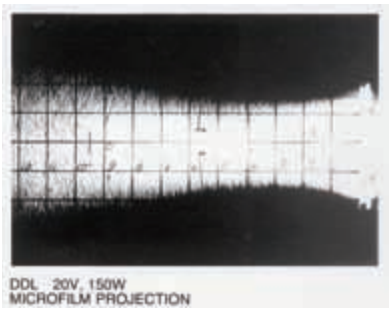


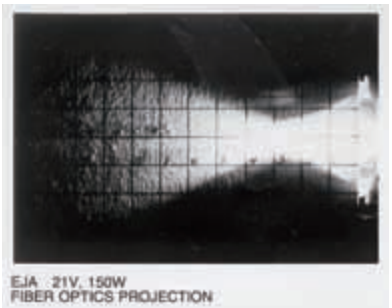
Front View of Modulamp Assembly

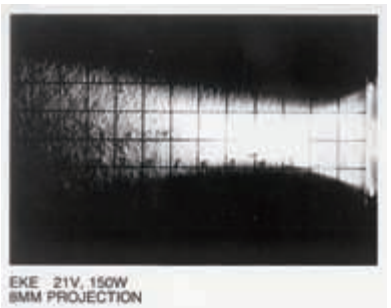
Spectral Curves w/Interference IR Filter



A08110, A08120 & A08130 - Lamp Beam Patterns







Beam Patterns are Courtesy of GE

Lamp Specifications

Bulb Type	Voltage	Wattage	Lamp Base	Bulb Finish	Burn Position	Shape	Color Temp.	Filament	Lamp Fill	Lamp Life	Overall Length (mm)	Reflector Design	Reflector Size (mm)	Working Distance (mm)
EJA	21	150	GX5.3	Clear	Base/Down Horiz.	MR-16	3350	CC-6	Halogen	40 Hrs.	44.5	Dichroic	50.7	28.0
EKE	21	150	GX5.3	Clear	Base/Down Horz.	MR-16	3250	CC-6	Halogen	200 Hrs.	44.5	Dichroic	50.7	44.5
DDL	20	150	GX5.3	Clear	Base/Down Horz.	MR-16	3150	CC-6	Halogen	500 Hrs.	44.5	Dichroic	50.7	194.5

RS232 Interface

A20650

A modular approach to computer control

- Can be used with any device requiring 0 to 5 volt control voltage input
- Scaling feature can convert output to 0.0 to 2.5 volts.
- Permits full range intensity control
- A single RS232 interface controls the intensity of up to three light sources. The intensity setting can vary for each.
- Lamp on/off feature is independent of intensity control. Manage on/off function of multiple light sources as one unit (DCR®III only)
- For maximized control from your computer, SCHOTT offers single, dual and triple RS232 cables (for DCR®III light sources only). This gives the computer the added cabability of reading lamp failure.
  - User must supply standard cables when connected to DCR® and DCR®II Series light sources.
- When used with SCHOTT's RS232 cables the interface can be powered from the 9-pin connector on the DCR®III light source, therefore a power supply is not required.
- RS232 single, dual, and triple cables are sold separately.
- Comes with LABVIEW® Driver, manuals, demo software and 5" Velcro® mounting strip
- CE compliant

LABVIEW® Driver, manuals, demo software, 5" Velcro® mounting strip, and wall transformer for the RS232 Interface.

RS232 Single Cable with Plug, A20661

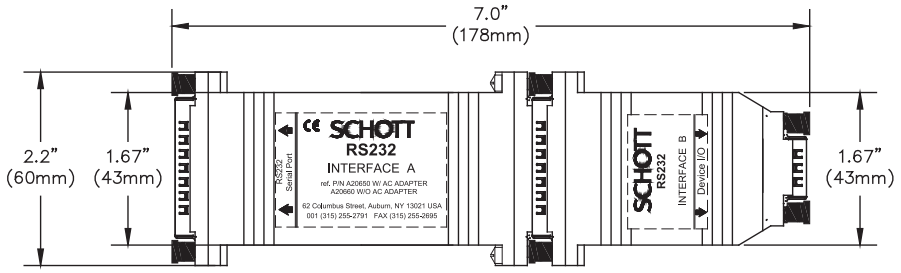
RS232 Interface

Part No.	Description
A20650*	RS232 Interface with UL approved 120V wall transformer
A20660*	RS232 Interface without wall transformer
RS232 Cables	
A20661	RS232 Single Cable with Plug
A20662	RS232 Dual Cable with Plug
A20663	RS232 Triple Cable with Plug

User supplies shielded DB-9 male/female connector and RS232 serial port to DB-25 Sub D type connector.

RS232 Interface

Dimensions in ( ) are in mm



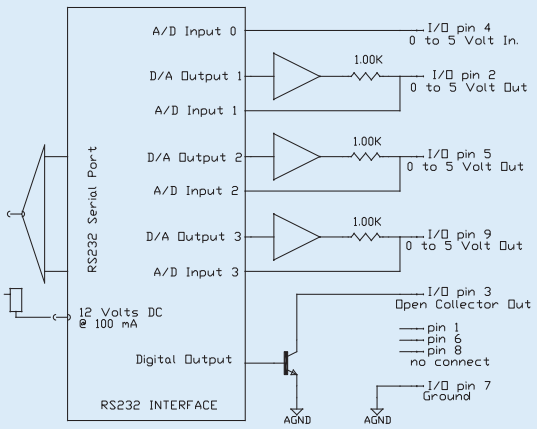
Power: 12 Volts DC @ 100 mA

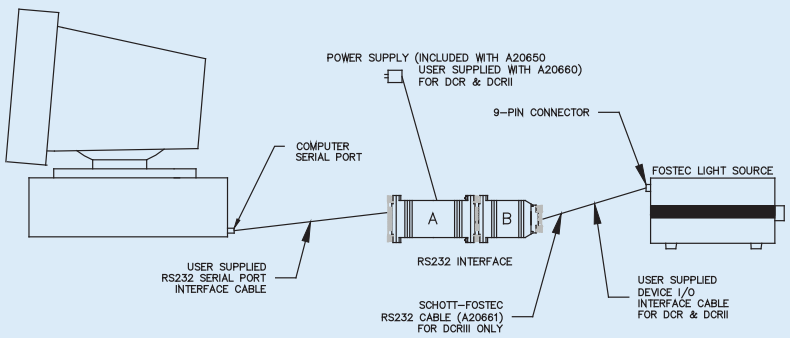
Connection: 2.5 mm sub-mini two connector plug

Data Format: 1200 - 9600 Baud (auto detect) 8 data bits, 1 stop bit, no parity

- Three buffered 0 to 5 Volt analog outputs with 8 bit resolution and x-2 scaling bit.
- One open collector output.
- Four 0.0 to 5.0 Volt analog inputs* with 12 bit resolution. Three are individually wired to the analog outputs for read back capability. One is available for general use.
- For specific lightsource I/O listings, please refer to the lightsource user's manual.

* DCR®II and DCR®III maintain stability regardless of intensity setting. DCR® may become unstable at voltage inputs less than 2 volts. Refer to RS232 User's Manual or contact SCHOTT for more information.





75 W RoHS CSA CE

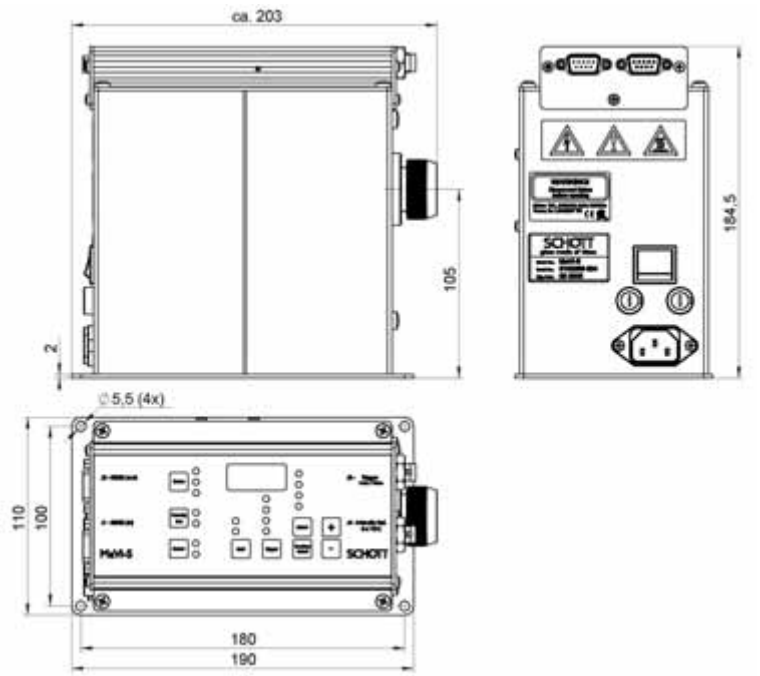
MaVi-S Light Source

High intensity xenon strobe light source for stop motion imaging

- Used together with SCHOTT light guides, the MaVi-S emits brief and intense light pulses that result in bright, clear and high-contrast images, a valuable tool for many applications, e.g. wafer inspection, bottle inspection, matric code reading and diamond quality control.
- High speed applications, short flash times are required as well as adjustable delays to capture the required images and information.
- CE Aproved
- ROHS compliant

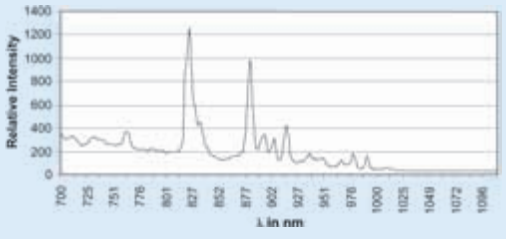
RS232 Interface

Dimensions in ( ) are in mm

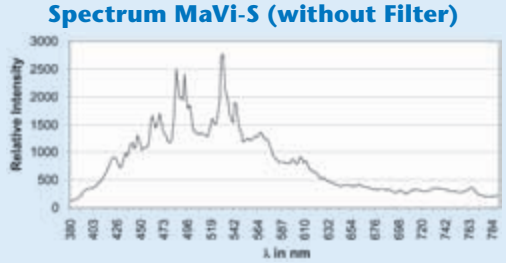


Technical Data	
Lamp type	Xenon Flashlamp
Maximum energy	Up to 2.16 J
Frequency range	1 Hz - 200 Hz
Flash duration	Approx. 6 µs
Pulse to pulse stability	2.5% from flash to flash with no loss of flashes
Electronic Data	
Intensity regulation	Via control panel computer (RS 232) or analog input
Computer interface	Control of up to 9 MaVi-S light sources
Burst function	Generation of several flashes by one trigger pulse
Power supply	100 V - 260 V. 50 Jz - 60 Hz
Power consumption	75 Watt
Fuses	1.6 A (slow blow)
Protection class	1 (protective grounding)
Electrical safety	IEC/EN 61010 and IEC/EN 6100
Ambient Conditions	
Operating temperature	0°C to 43°C
Storage temperature	- 40°C to 90°C
Relative humidity	Max. 80 %, non condensing
Housing	
Outer dimensions	110 mm x 200 mm x 180 mm
Weight	2 kg

IR Spectrum MaVi-S (without Filter)



Spectrum MaVi-S (without Filter)



Light Guides

Universal Ringlights

For 33 to 81 mm Objective Diameters

Universal Ringlight A08600 (classic clamp syle)

Universal Ringlight, A08600.1 (new clamp style)

SCHOTT ringlights emit intense, uniform, and shadow-free illumination for Machine Vision and Microscopy applications.

- Fits microscope and camera objectives from 33 to 81 mm with appropriate clamps
- Working distance is 1.5" to 6" (38 to 152 mm)
- 33" (838 mm) bundle length on all models
- The ringlight body is made of rugged, black anodized aluminum and the fiber bundle is protected with flexible PVC covered metal tubing.
- Two unique clamping/mounting systems for precise positioning. Most ringlights fit directly onto the microscope and camera objective without adapters.
- Input fits all ColdVision light sources. Ringlights can be used with other manufacturer's continuous light sources. Adapters may be required.
- Use ringlights with our Dichroic color filters, diffusers, polarizer/analyzers, and reflector rings for alternative lighting effects.
- Vertical exit bundle option increases work space and prevents the bundle from interfering with surrounding objects.
- Modified standard and custom ringlights are also available for your unique requirements.
- ESD (Electro Static Discharge) option is available on custom basis.

Anti-Slip Ringlight Clamps, A08614

Anti-Slip Ringlight Clamps, A08601

Anti-Slip Ringlight Clamps, A08602

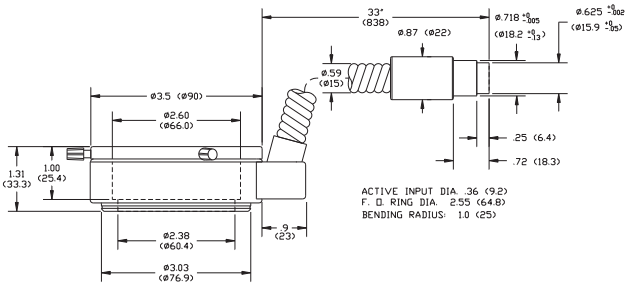
Amti Slip Ringlight Clamps:
For accurate positioning when using fiber optic components in industrial and laboratory environments.

Universal Ringlights

Dimensions in ( ) are in mm

Ringlight Input: Black Anodized Aluminum or Conductive Finish
Bundle Sheathing: PVC Covered Metal Tubing or Stainless Steel
Working Distance: 1.5" to 6" (38 to 152)

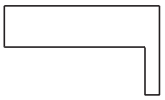
Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.



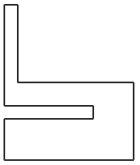
A08620 - 47 mm / 62 mm Ringlight with vertical exit (classic clamp)

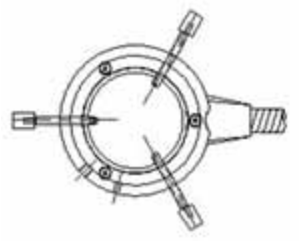
Clamp(s) for A08611 Clamp Ring, A08600 and A22000 Ringlights and A08614, Set of 3 Clamps 1.8 / 2.4" (47/62)

Clamp(s) for A08612 Clamp Ring, A08603 Ringlight and A08601, Set of 3 Clamps 1.3 / 1.8" (33/46)

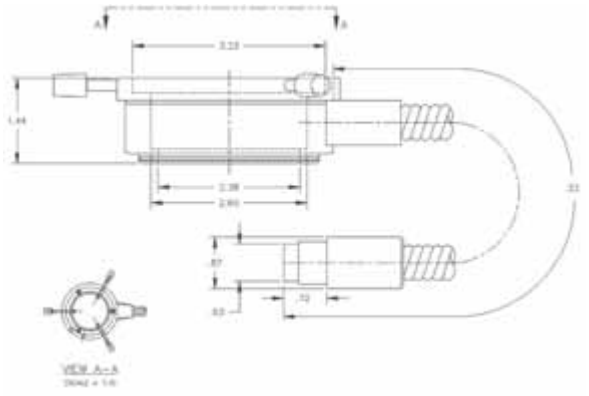


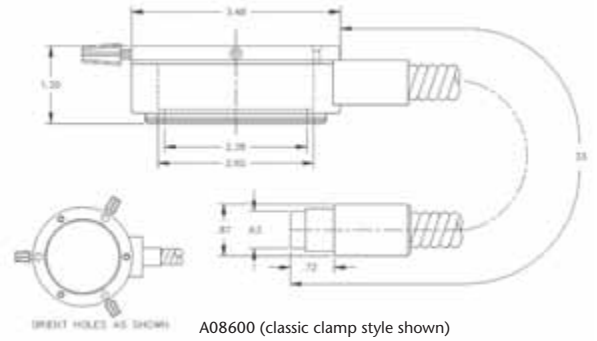
Clamp(s) for A08613 Clamp Ring, A08604 Ringlight, and A08602, Set of 3 Clamps 2.4 / 3.2" (62/81)





A08690 (new clamp style shown)





A08600 (classic clamp style shown)

Universal Ringlight

Part No.	Standard Exit	Vertical Exit	Minimum Working Distance	Objective diameter Camera and Microscope	Mounting	Polarizer/ System Analyzer
A08600	X		1.5" - 6"	47 to 62 mm	Clamps (classic)	A08615
A08600.1	X		1.5" - 6"	47 to 62 mm	Clamps (new)	A08615
A08620		X	1.5" - 6"	47 to 62 mm	Clamps (classic)	A08615
★ **A08690**	X		1.5" - 6"	33 to 81 mm	Clamps (classic)	A08615
A08601.1	Ringlight Screw					

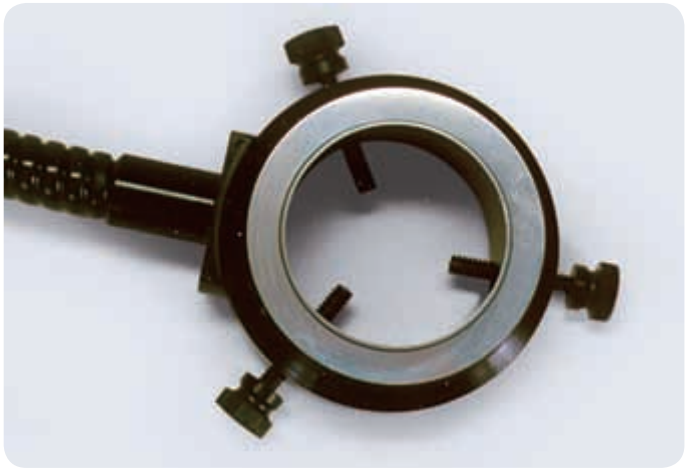
★ Made-to-order products.

Holders, Clamp Rings, and Anti-slip Pads

Part No.	Description
A08614	Anti-slip Ringlight Clamps for ringlight models A08600, A08620. (3 clamps in package) (47 mm to 62 mm)
A08601	(33 mm to 46 mm)
A08602	(62 mm to 81 mm)

Midi, Mini and Maxi Ringlights

For 19 to 53 mm Objective Diameters



Mini Ringlight, A08650

SCHOTT ringlights emit intense, uniform, and shadow-free illumination for Machine Vision and Microscopy applications.

Mini Features

- Fit microscope and camera objectives from 19 to 32.5 mm
- Working distance is .5" to 4" (13 to 102)

Midi Features

- Fit microscope and camera objectives from 38 to 53 mm
- Working distance is 1.25" to 3.5" (32 to 89)*

Midi & Mini Ringlight Features

- Thumbscrew mounting system for precise positioning. Ringlights fit directly on most microscope and camera objectives without adapters. For instances when adapters are necessary, see the Accessories section of the catalog.
- Vertical exit bundle option increases work space and prevents the bundle from interfering with surrounding objects.
- The ringlight body is made of rugged, black anodized aluminum. The fiber bundle is protected with flexible PVC covered metal tubing.

4" Ringlight

- Fiber ring diameter is 4.5" (114*)
- Working distance ranges from 2" to 8" (51 to 203)
- Light exits at 40 degree angle for specular-free illumination
- Randomized fiber bundle maximizes uniformity.
- The ringlight body is made of rugged, black anodized aluminum and the fiber bundle is protected with flexible PVC covered metal tubing.

8" Ringlight

- Low Profile ringlights for working distances from 2.5" to over 4.5 (64 to 114)
- #1/4-20 mounting threads in the coupler (front and top)
- The ringlight body is made of rugged, black anodized aluminum and the fiber bundle is protected with stainless steel tubing.

4" Ringlight, A08700

8" Ringlight, A08710

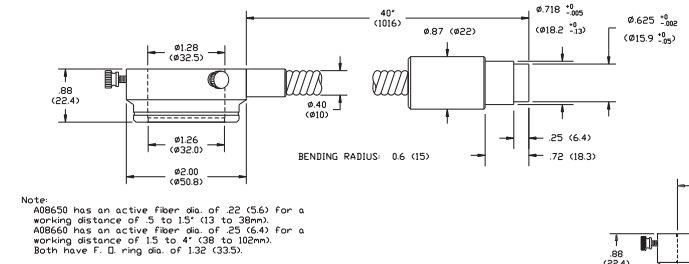
DCR® III Light Source

Dimensions in ( ) are in mm

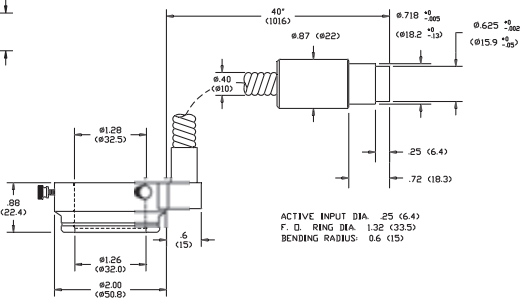
Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

Ringlight Input: Black Anodized Aluminum or Conductive Finish

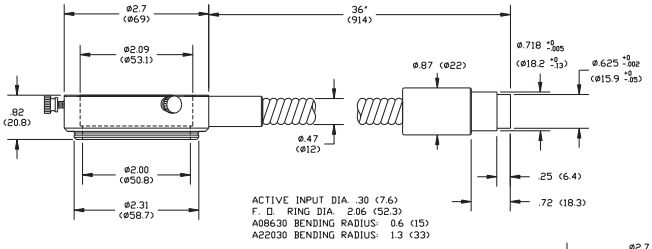
Bundle Sheathing: PVC Covered Metal Tubing or Stainless Steel


Note:
A08650 has an active fiber dia. of .22 (5.6) for a working distance of .5 to 1.5" (13 to 38mm).
A08660 has an active fiber dia. of .25 (6.4) for a working distance of 1.5 to 4" (38 to 102mm).
Both have F. O. ring dia. of 1.32 (33.5).
BENDING RADIUS: 0.6 (15)

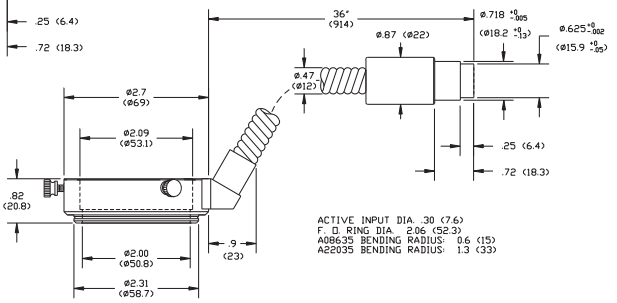
A08650 - A08660 - 19 / 32.5 mm Ringlights



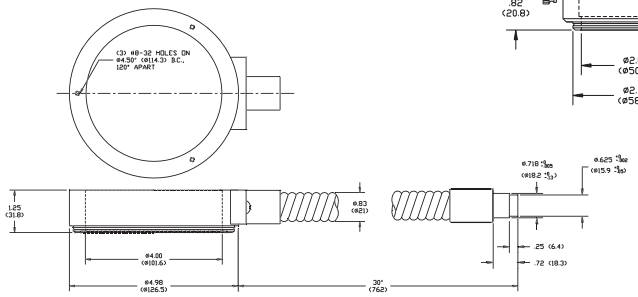
A08670 - 19 / 32.5 mm Ringlight with Vertical Exit



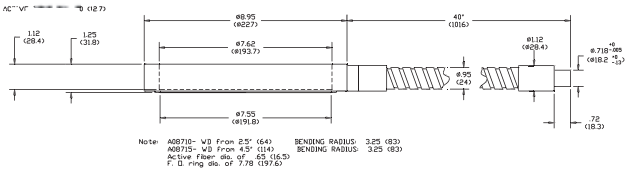
A08635 & A22035 - 38 / 53 mm Ringlights with Vertical Exit



A08630 & A22030 - 38 / 53 mm Ringlights with Vertical Exit



A08700 4" Ringlights


Note: A08710- WD From 2.5" (64)
A08715- WD From 4.5" (114)
Active Fiber dia. of .65 (16.5)
F. O. ring dia. of 7.78 (197.6)
BENDING RADIUS: 3.25 (83)
BENDING RADIUS: 3.25 (83)

A08710 8" Ringlights

Maxi Ringlights

Part No.	ID	OD	Working Distance	Bundle Length	Polarizer/ Analyzer
A08700	4" (102)	9.98" (127)	2" - 8" (51 - 203)	30" (762)	A08705
★ **A08710**	7.5" (191)	8.95" (227)	2.5" - 4.5" (64 - 114)*	40" (1016)	★ A08712

Use ringlights with our Dichroic color filters, diffusers, and polarizers for alternative lighting effects. Maci Ringlights will require an adapter, part number A08931, due to the size of the input.

Mini Ringlights

Part No.	Standard Exit	Vertical Exit	Working Distance	Polarizer/ Analyzer
A08650	X		.5" - 1.5" (13 - 38)	A08632
A08660^	X		1.5" - 4" (38 - 102)*	★ A22032
A08670^		X	1.5" - 4" (38 - 102)*	A08627
Midi Ringlights				
A08630	X		1.25" - 3.5" (32 - 89)*	A08632
A08635		X	1.25" - 3.5" (32 - 89)*	A22032

★ Made-to-order products.

^ 29% more fiber than A08650 ringlight

*Dimensions in ( ) are in mm

Ringlights, 66mm

66 mm Ringlight, A08625

For intense, uniform, and shadow-free illumination

- Ringlights fit 66 mm microscope and camera objectives. Also shown on this sheet is a tapered inner-body ringlight for the Nikon SMZ 645/600 microscope. See model number A22040^.
- Working distance is 1.5" to 6" (38 to 152)
- 33" (838) bundle length on all models
- The ringlight body is made of rugged, black anodized aluminum and the fiber bundle is protected with flexible PVC covered metal tubing except the ESD (Electro Static Discharge) models.
- ESD ringlights are made conductive by replacing the black anodized finish with a conductive finish and the PVC metal tubing with stainless steel tubing. Each ringlight is checked for conductivity from inner body to light source adapter. (Available custom)
- Thumbscrew clamping/mounting system for precise positioning (except for model number A22040). Ringlights fit directly onto most microscope and camera objectives without adapters.
- Clamp rings for the Universal ringlights also fit the 66 mm ringlights for use with a different diameter objective microscope or with the Ringlight Holder. (See the Support Apparatus for Ringlights section of the catalog for more information.)
- Input fits all ColdVision light sources. Ringlights can be used with other manufacturer's continuous light sources. Adapters may be required.
- Use ringlights with our Dichroic color filters, diffusers, polarizer/analyzers and reflector rings for alternative lighting effects.
- Modified standard and custom ringlights are also available for all your unique requirements.

ESD 66 mm Ringlight (custom)

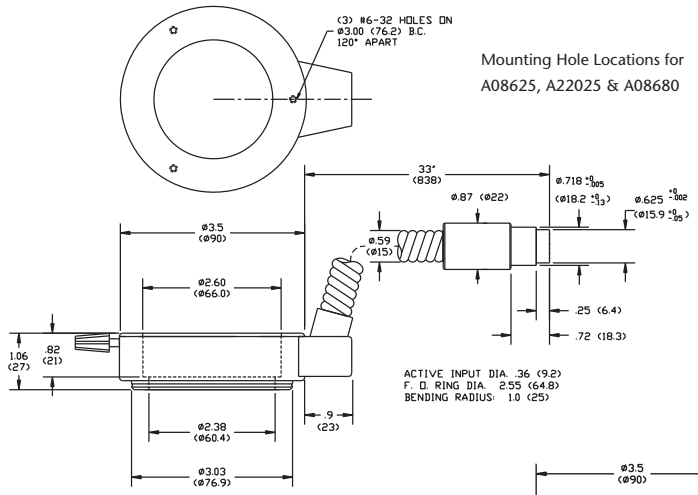
Vertical Exit 66 mm Ringlight, A08680

Ringlights, 66mm

Dimensions in ( ) are in mm

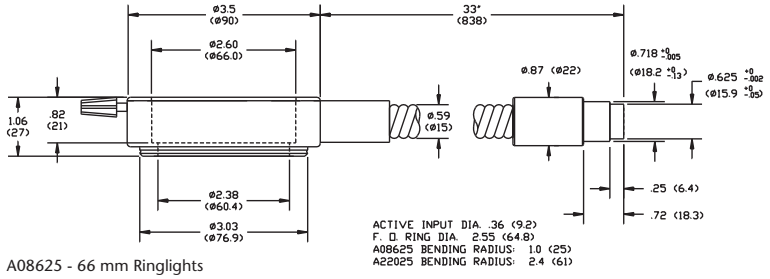
Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

Ringlight Input: Black Anodized Aluminum or Conductive Finish
Bundle Sheathing: PVC Covered Metal Tubing or Stainless Steel
Working Distance: 1.5" to 6" (38 to 152)

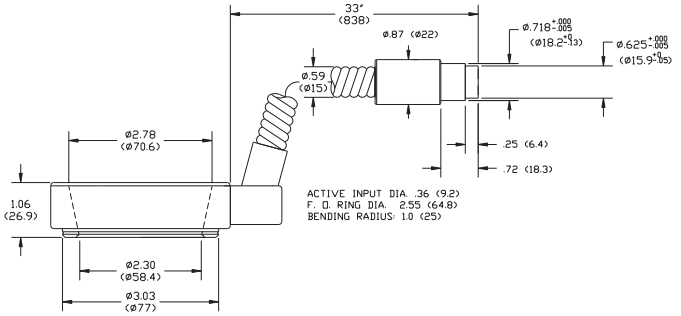


Mounting Hole Locations for
A08625, A22025 & A08680

A08680 - 66 mm Ringlight with Vertical Exit



A08625 - 66 mm Ringlights



A22040 - Nikon SMZ 645/660 Ringlight with Vertical Exit and Retaining Ring

Ringlights, 66mm

Part No.	Standard Exit	Vertical Exit	ESD	Objective Diameter	Mounting System	Polarizer/ Analyzer
A08625	X			66 mm	Thumbscrew	A08615*
A08680		X		66 mm	Thumbscrew	A08615*
Custom			X	66 mm	Thumbscrew	N/A

* If using the A08626 adapter, use A08627 polarizer/analyzer

Ringlights, 58mm

Ringlight, A22040 with Retaining Ring

Designed to fit Nikon SMZ and Leica S4E and S6E microscopes

- Working distance is 1.5" to 6" (38 to 152)
- 33" (838) bundle length on all models
- The ringlight body is made of rugged, black anodized aluminum and the fiber bundle is protected with flexible PVC covered metal tubing except the ESD (Electro Static Discharge) models.
- ESD ringlights are made conductive by replacing the black anodized finish with a conductive finish and the PVC metal tubing with stainless steel tubing. Each ringlight is checked for conductivity from inner body to light source adapter.
- Vertical exit bundle increases work space and prevents the bundle from interfering with surrounding objects.
- Retaining ring mounting for the A22040 ringlight offers secure positioning.
- Thumbscrew clamping/mounting system for precise positioning on the A22050 & A22060 models. Ringlights fit directly onto microscope and camera objectives without adapters.
- A22050 and A22060 ringlights will fit on all auxiliary lenses for the S4E and S6E microscopes.
- Use ringlights with our Dichroic color filters, diffusers, polarizer/analyzers, and reflector rings for alternative lighting effects.
- Modified standard and custom ringlights are also available for all your unique requirements.

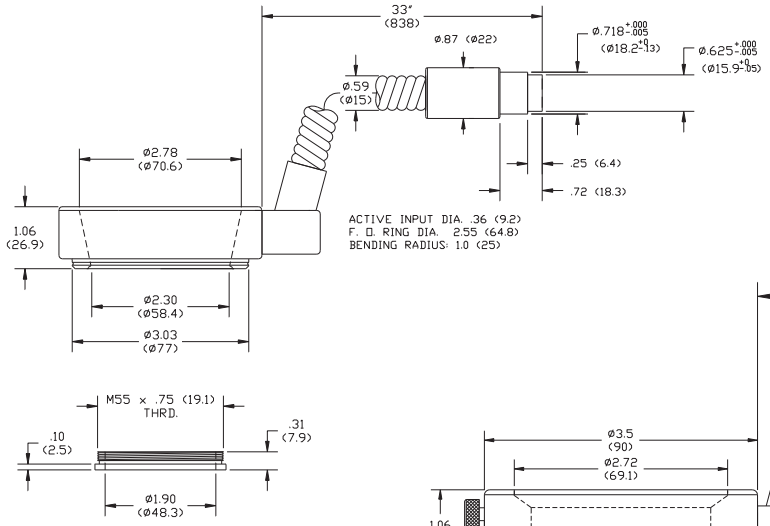
Ringlight, A22050

Ringlights, 58mm

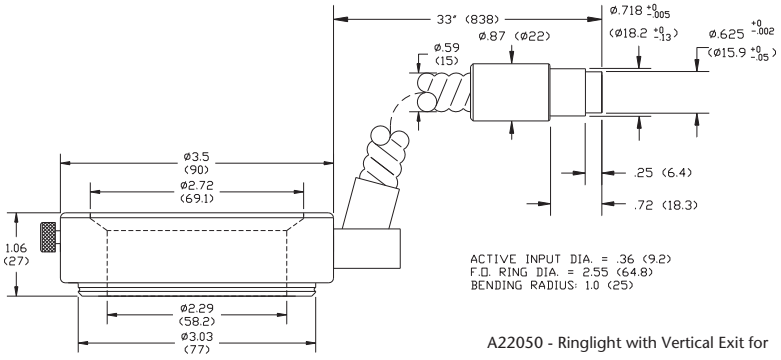
Dimensions in ( ) are in mm

Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

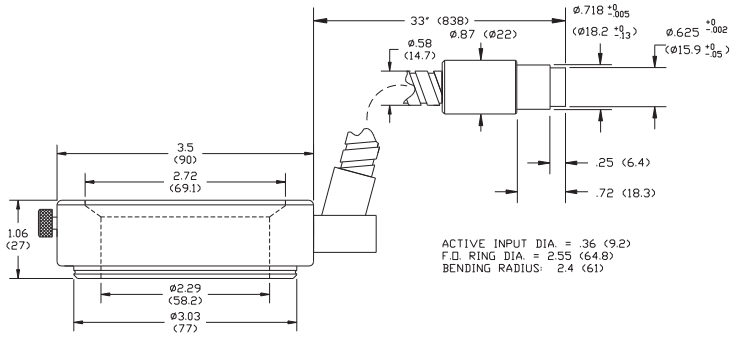
Ringlight Input: Black Anodized Aluminum or Conductive Finish
Bundle Sheathing: PVC Covered Metal Tubing or Stainless Steel
Working Distance: 1.5" to 6" (38 to 152)



A22040 - Ringlight with Vertical Exit and Retaining Ring for Nikon SMZ 645/660 Microscopes



A22050 - Ringlight with Vertical Exit for Leica S4E/S6E Microscopes



A22060 - ESD Ringlight with Vertical Exit for Leica S4E/S6E Microscopes

Ringlights, 58mm

Part No.	ESD	Objective Diameter	Mounting System	Polarizer/ Analyzer
A22040*		Nikon SMZ 645/660	Retaining Ring	★ A22042
A22050		Leica S4E/S6E	Thumbscrew	★ A22052
A22060	X	Leica	Thumbscrew	Custom

★ Made-to-order products.

*The A22040 ringlight has a tapered ring diameter to use with SMZ 645/660 microscope. A retaining ring is used for mounting instead o a thumbscrew

Darkfield Ringlight

Darkfield Ringlight, A22780

Unique parabolic reflector ring creates a radial "light sheet" for oblique lighting effects.

- Eliminates need for a quad lightline and mounting hardware to create similar lighting effects
- Randomized bundle creates extremely uniform light output.
- Remove the reflector ring to create a long working distance ringlight.
- Can be used with continuous or strobe light sources. Standard input adapter accepts the full range of all our color filters.
- Three #8-32 threaded mounting holes in the top of the ringlight body facilitate fixturing.
- Rugged aluminum body and light source adapter with black anodized finish
- PVC covered metal tubing protects the fiber bundle.

Typical Applications

- BGA (Ball Grid Array) inspection
- Illuminating scratches on highly reflective surfaces
- Water contamination inspection

Actual image of BGA (Ball Grid Array) chip illuminated by a Darkfield ringlight clearly identifies where solder balls are missing.

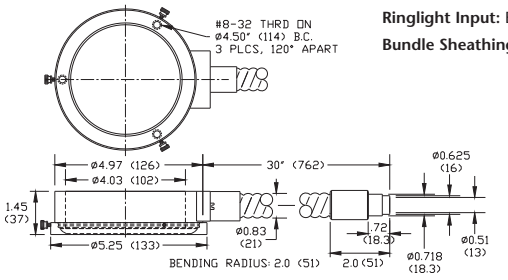
Darkfield Ringlights

Part No.	Standard Exit	ID	OD	Working Distance	Bundle Length
A22780	X	4.03" (102)	5.25" (134)	0" - .25" 0"-6.35)	30" (762)

*Dimensions in ( ) are in mm

Darkfield Ringlight

Dimensions in ( ) are in mm

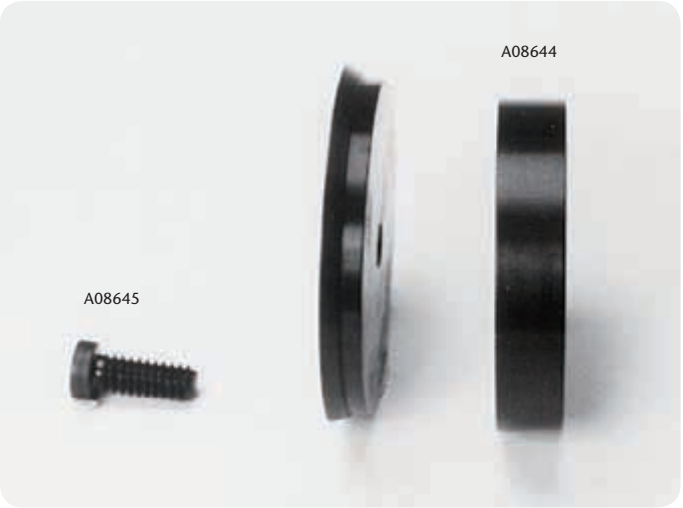


Ringlight Input: Black Anodized Aluminum
Bundle Sheathing: PVC Covered Metal Tubing or Stainless Steel

A22780
Darkfield Ringlight

Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

Darkfield Illuminator / Ringlight Adapters



Darkfield Illuminator, Adapter, A08645 and Spacer Ring, A08644

Ringlight adapters for microscope objectives and darkfield lighting.

- Fiber optic full annular ring configuration.
- Dovetail adapters for a variety of microscopes attach to slide the illuminator into place under the microscope stage. See chart on left for adapter specifications. Please note that a spacer ring, A08644, is required for the A08645 model adapter.
- Does not interfere with microscope operation
- Light exits at a nominal 20° horizontal angle and will illuminate a 1" (25.4)* diameter area
- Ringlight comes with a fixed size aperture to shield optic from light.
- Working distance from .10" (2.5) to .38" (9.7)
- Optional Iris Aperture allows adjustment of the darkfield spot size for light sensitive applications.

Darkfield Illuminator & Accessories

Part No.	Description
★ A08644	Darkfield Spacer Axio 2 for A08645 Adapter
Dovetail Adapters	
★ A08645	Dovetail Adapter for Zeiss Axioplan (see A08644)
★ A08646	Dovetail Adapter for Leitz Laborlux, DMR
★ A08647	Dovetail Adapter for Olympus
★ A08649	Dovetail Adapter for Zeiss Axioskop

★ Made-to-order products.

Ringlight to Microscope Adapters

A08606

A08607

A08608

A08609

A08626

A08628

Ringlight Adapters

Part No.	Ringlight	Microscope	Mounting
A08606	**A08600**	B&L Zoom 4	Screws into Objective
A08607	**A08625**	Leica SZ4/SZ6 with auxiliary lens	Three Thumscrews
A08608	**A08625**	Leica SZ4/SZ6 without auxiliary lens	Screws into objective
A08609	**A08630**	Leica SZ7	#6 - 32 Hex Set Screw
A08626	**A08625**	Olympus SZ	Screw-on Retaining Ring
A08628	**A08600, A08620**	SMZ 645/660	Screws on Objective

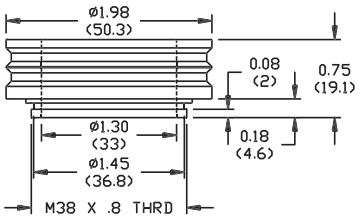
Note:
Adapters are machined to order. Pricing and Availability subject to market conditions.
Drawings are available.

Ringlight Adapters

Dimensions in ( ) are in mm

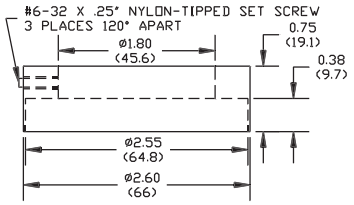
A08606

Ringlight Adapter



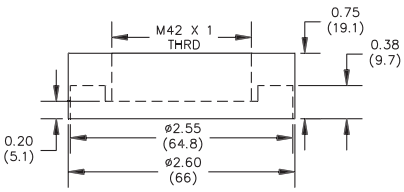
A08607

Ringlight Adapter



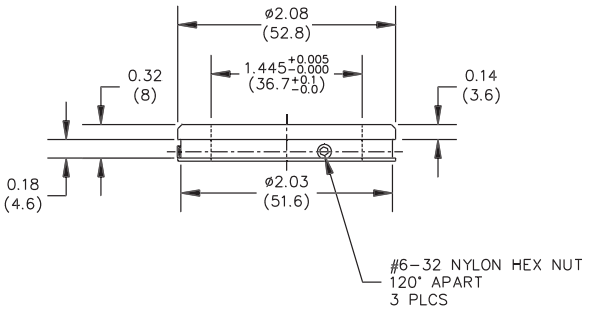
A08608

Ringlight Adapter



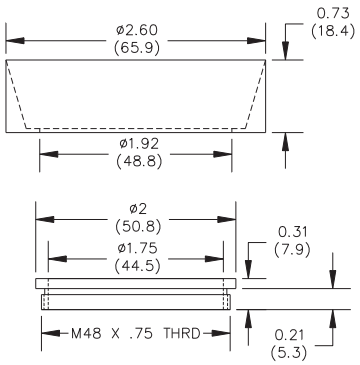
A08609

Ringlight Adapter



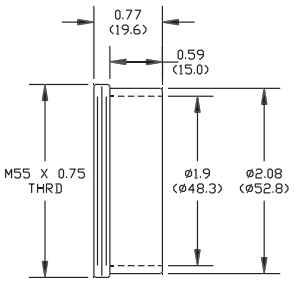
A08626

Ringlight Adapter

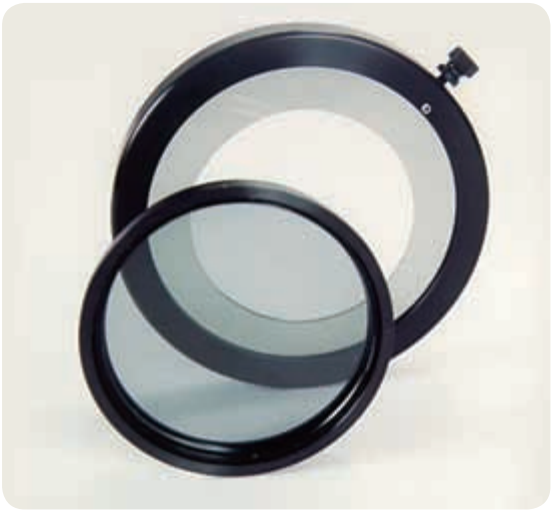


A08628

Ringlight Adapter



Ringlight Polarizers & Analyzers



Polarizer/Analyzer, A08615

The polarizing effect enhances contrast on highly reflective surfaces for Microscopy and Machine Vision Applications.

- The polarizer/analyzer reduces reflection and glare.
- The A08615 and A08632 polarizers were designed to easily snap-fit onto the ringlight. The analyzer is dropped through the top of the ringlight and positioned on top of the polarizer.
- To prevent the polarizer/analyzer from moving due to vibration, a knurled thumb-screw locks the polarizer assembly into position. In addition, it makes the holder easier to adjust. To further prevent vibration, a set-screw stops the polarizer disk from turning within the assembly. These features are found on polarizer / analyzer model numbers A08615 and A08627.

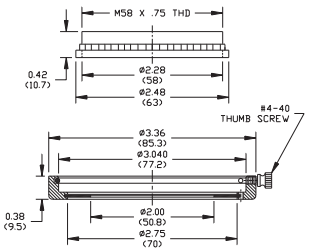
Polarizers & Analyzers

Part No.	Corresponding Ringlights
A08615	A08600, A08620, A08625, A08680, A08600.1
A08627	A08625 & Olympus Adapter, part number A08626
A08632	A08630, A08635
A08652	A08650, A08660, A08670
A08705^	A08700

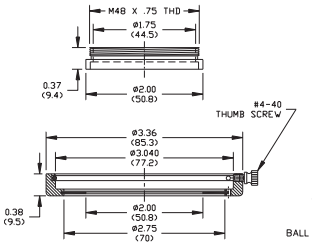
^Polarizer ring only. User must supply analyzer.

Ringlight Polarizers & Analyzers

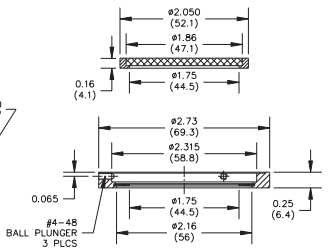
Dimensions in ( ) are in mm



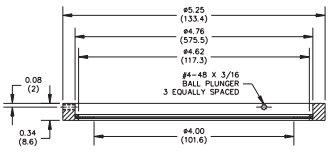
A08615
Polarizer/Analyzer



A08627
Polarizer/Analyzer



A08632
Polarizer/Analyzer



A08705
Polarizer/Analyzer

Diffuse Dome

For use with 4″ Fiber Optic Ringlight A08700

Diffuse Dome A25045 with Ringlight, A08700 (Ringlight not included)

Diffuse dome to eliminate specular reflection on shiny surfaces.

Standard Features

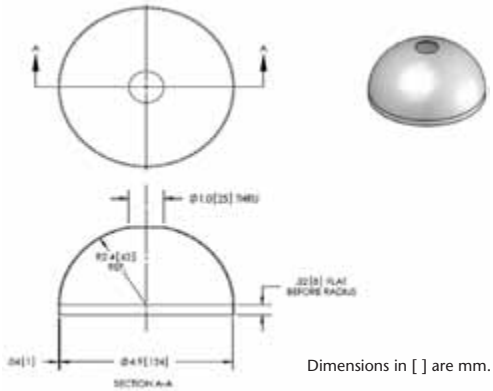
- Eliminates specular glints and/or shadows on reflective parts
- Used in conjunction with 4″ diameter ringlight A08700
- 4.9″ (124 mm) diameter x 2.70″ (69 mm) height (without ringlight)
- Viewing aperature: 0.98 (25 mm)

Typical Applications

- Data matric code reading
- OCR/OCV
- Semiconductor wafer inspection
- Foil inspection
- Can inspection

Diffuse Dome

Dimensions in ( ) are in mm



Dimensions in [ ] are mm. All other dimensions are Inches.

Ringlight Reflector Rings / Ringlight Support Apparatus

For use with 4" Fiber Optic Ringlight A08700

Reflector Ring, A08616

Reflector rings create special lighting effects.

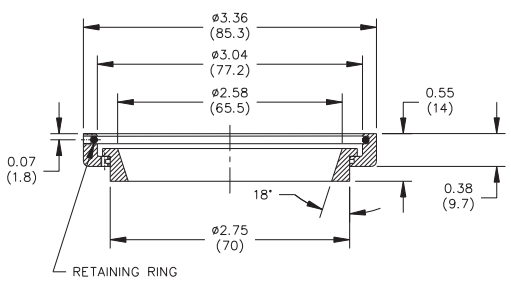
- Illuminates scratches on highly reflective surfaces
- The A08616 reflector ring fits our Universal and 66 mm Series of ringlights. See chart below for part numbers.
- The A08616 reflector ring comes in two separate parts; the retaining ring and the reflector ring. The reflector ring drops inside the retaining ring which snap-fits onto the ringlight.
- The reflector ring is made of mirror polished aluminum. The retaining ring is made of aluminum with a black anodized finish.

Ringlight Reflector Rings

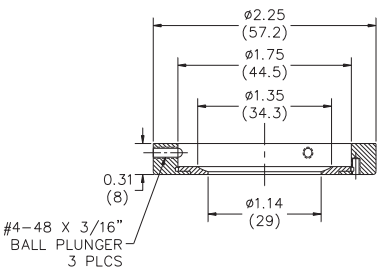
Part No.	Ringlights
A08616	A08600, A08603, A08604, A08620, A08625, A08680, A08600.1

Ringlight Reflector Rings

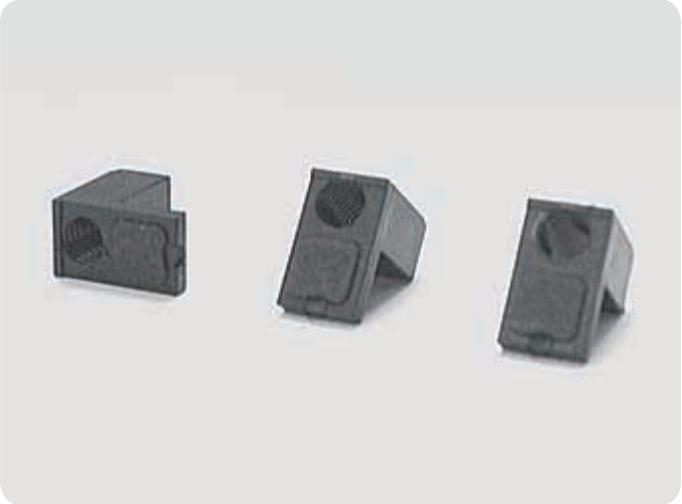
Dimensions in ( ) are in mm



A08616 Ringlight Reflector Ring



A08653 Ringlight Reflector Ring



Anti-Slip Ringlight Clamps, A08614

For accurate positioning when using fiber optic components in industrial and laboratory environments

Support Apparatus

Holders, Clamp Rings, and Anti-slip Pads	
Part No.	**Description**
A08614	Anti-slip Ringlight Clamps for ringlight models A08600, A08620. (3 clamps in package)

Ringlight Support Apparatus

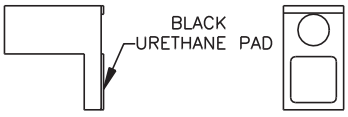
Dimensions in ( ) are in mm

Clamp(s) for
A08611 Clamp Ring,
A08600 and A22000
ringlights and
A08614,Set of 3 Clamps
1.8 / 2.4" (47/62)

Clamp(s) for
A08612 Clamp Ring,
A08603 ringlight and
A08601, Set of 3 Clamps
1.3 / 1.8" (33/46)

Clamp(s) for
A08613 Clamp Ring,
A08604 ringlight, and
A08602, Set of 3 Clamps
2.4 / 3.2" (62/81)

A08614
Clamps with Anti-slip Pads
(Set of 3)



Single Bundles

Single Bundle, A08031.60

Flexible bundles give the user versatility when routing and positioning light.

- Tight bending radius for easy routing
- A variety of standard sizes. See chart below for part numbers and specifications. Dual and quad bundles are found on a separate page in the product catalog.
- The standard output ferrules accept spot lenses accept polarizing caps. (See the Accessories section of the product catalog for more details.)
- Standard input accepts Dichroic color filters, diffusers and ColdVision Series light sources.
- Support products are available in the Support Apparatus section of the product catalog. Adaptors may be required.
- Custom configurations are available. Additional lead time is required.

Bundle

Part No.	Active Input Fiber Diameter	Distal Ferrule Diameter	Tubing Diameter	Bundle Length
A08020.40	.20″ (5)	.393″ (10)	.39″ (10)	40″ (1016)
A08020.60	.20″ (5)	.393″ (10)	.39″ (10)	60″ (1524)
A08025.40	.25″ (6)	.393″ (10)	.47″ (12)	40″ (1016)
A08025.60	.25″ (6)	.393″ (10)	.47″ (12)	60″ (1524)
A08031.40	.30″ (8)	.393″ (10)	.47″ (12)	40″ (1016)
A08031.60	.30″ (8)	.393″ (10)	.47″ (12)	60″ (1524)
A08031.80	.30″ (8)	.393″ (10)	.47″ (12)	80″ (2032)
A08051.40	.51″ (13)	.625″ (16)	.75″ (19)	40″ (1016)
A08051.60	.51″ (13)	.625″ (16)	.75″ (19)	60″ (1524)
A21200	.40″ (10)	.507″ (13)	.69″ (18)	30″ (762)

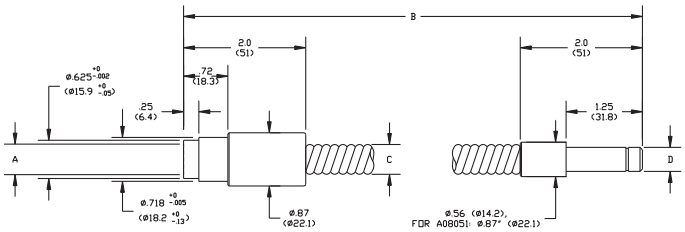
Dimensions in ( ) are in mm

Single Bundles

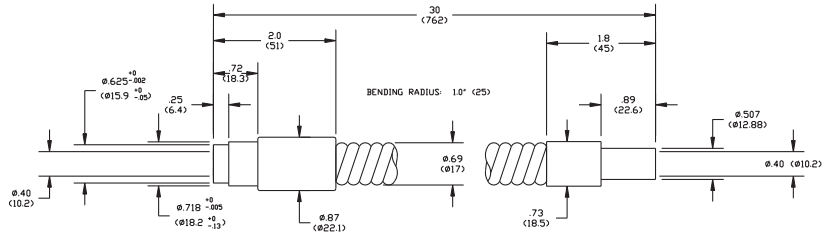
Dimensions in ( ) are in mm

Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

Ringlight Input: Black Anodized Aluminum
Bundle Sheathing: PVC Covered Metal Tubing



A08020.40 - A08051.60
Single Bundles



A21200
Bundle

Matrix for A08020.40 - A08051.60 Bundles

Part No.	A	B	C	Bend Radius	D
A08020.40	.20" (5)	40" (1016)	.39" (10)	.5" (13)	.393" (10)
A08020.60	.20" (5)	60" (1524)	.39" (10)	.5" (13)	.393" (10)
A08025.40	.25" (6)	40" (1016)	.47" (12)	.6" (15)	.393" (10)
A08025.60	.25" (6)	60" (1524)	.47" (12)	.6" (15)	.393" (10)
A08031.40	.30" (8)	40" (1016)	.47" (12)	.6" (15)	.393" (10)
A08031.60	.30" (8)	60" (1524)	.47" (12)	.6" (15)	.393" (10)
A08031.80	.30" (8)	80" (2032)	.47" (12)	.6" (15)	.393" (10)
A08051.40	.51" (13)	40" (1016)	.75" (19)	1.4" (36)	.625" (16)
A08051.60	.51" (13)	60" (1524)	.75" (19)	1.4" (36)	.625" (16)
A21200	.40" (10)	30" (762)	.69" (18)	1.0" (25)	.507" (13)

Dual and Quad Bundles

Quad Bundle, A08545

Flexible bundles give the user versatility when routing and positioning the light.

- Tight bending radius for easy routing
- A variety of standard sizes in dual and quad configurations (See chart below for dual and quad bundle part numbers and specifications.)
- Multi-leg bundles are illuminated with one light source.
- The standard output ferrules accept spot lenses with or without polarizing caps. (See Accessories section of the product catalog for more details.)
- Standard input accepts Dichroic color filters, diffusers and ColdVision Series light sources.
- Support products are available in the Support Apparatus section of the product catalog.
- Custom configurations are available. Lead time is required.

Dual Bundle, A08550.72

Dual and Quad Bundles

Part No.	Active Input Fiber Diameter	Distal Ferrule Diameter	Tubing Diameter	Bundle Length
Dual Bundles				
A08530	.30″ (8)	.393″(10)	.40″ (10)	40″(1016)
A08540	.36″ (9)	.393″ (10)	.47″ (12)	40″(1016)
A08550	.43″ (11)	.393″ (10)	.47″ (12)	40″(1016)
A08550.72	.43″ (11)	.393″ (10)	.47″ (12)	72″ (1829)
Quad Bundles				
A08545	.50″ (13)	.393″ (10)	.47″ (12)	40″ (1016)

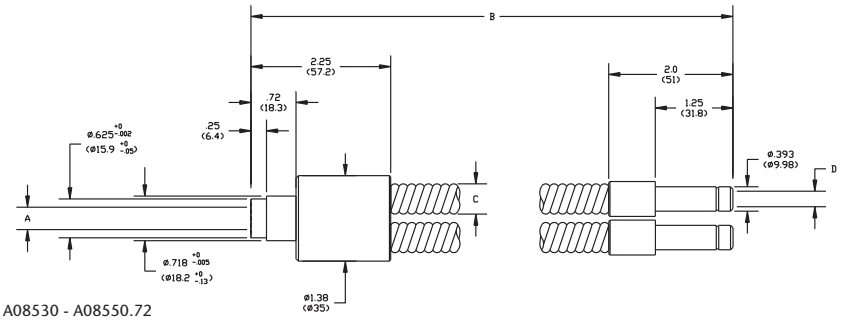
Dimensions in ( ) are in mm

Dual and Quad Bundles

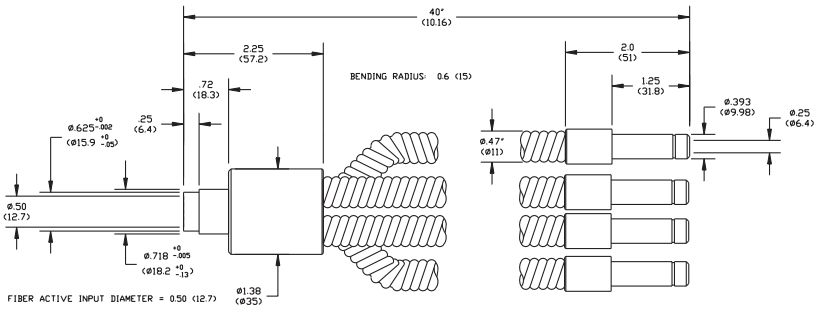
Dimensions in ( ) are in mm

Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

Ringlight Input: Black Anodized Aluminum
Bundle Sheathing: PVC Covered Metal Tubing



A08530 - A08550.72
Dual Flexible Bundles



A08545
Quad Flexible Bundles

Matrix for A08530 - A08550.72 Dual Bundles

Part No.	A	B	C	Bend Radius	D
A08530	.30" (8)	40" (1016)	.40" (10)	.5" (13)	.21" (5.3)
A08540	.36" (9)	40" (1016)	.47" (12)	.6" (15)	.25" (6.4)
A08550	.43" (11)	40" (1016)	.47" (12)	.6" (15)	.30" (7.6)
A08550.72	.43" (11)	72" (1829)	.47" (12)	.6" (15)	.30" (7.6)

Randomized and Calibrated Bundles

Quad Randomized and Calibrated Bundle, A21045

Designed to increase uniformity of light output for Machine Vision applications

- Fibers are randomized to improve spot uniformity.
- For specific uniformity requirements, calibrated outputs on dual and quad bundles were designed to be interchangeable for Machine Vision inspection applications. Interchangeability was achieved by maintaining light intensity within 10% bundle to bundle.
- We assure consistency by adding a 12" (305)* randomized common end at the input. This extra 12" (305) of fiber scrambles the light, distributing any hot or cold spots from the lamp throughout each of the legs. Then, each one of the legs is calibrated so the output from each leg is within 5% of each other.
- Tight bending radius for easy routing
- A variety of standard sizes include single, dual, and quad configurations. See chart on left for part numbers and specifications.
- Multi-leg bundles are illuminated with one light source.
- The standard output ferrules accept spot lenses with or without polarizing caps. (See Accessories section of the product catalog for more details.)
- Custom configurations are available. Lead time is required.

Single Randomized Bundle, A08031.40R

Single Bundle, A08031.60R

Randomized and Calibrated Bundles

Part No.	Configuration	Active Input Fiber Diameter	Distal Ferrule Diameter	Tubing Diamter	Bundle Length
Randomized Bundles					
A08031.40R	Single	.30"(8)	.393" (10)	47"(12)	40"(1016)
★ **A08031.60R**	Single	.30"(8)	.393" (10)	47"(12)	60"(1524)
★ **A08031.80R**	Single	.30"(8)	.393" (10)	47"(12)	80"(2032)
Randomized and Calibrated Bundles - 12"(305) Common Bundle Length					
A21040	Dual	.36" (9)	.393" (10)	.60" (15)	48"(1219)
A21045	Quad	.51" (13)	.393" (10)	.83" (21)	48"(1219)
A21050	Dual	.43" (11)	.393" (10)	.67" (17)	48"(1219)

★ Made-to-order products.

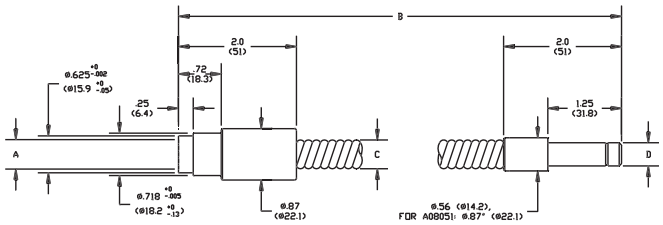
Dimensions in ( ) are in mm

Randomized and Calibrated Bundles

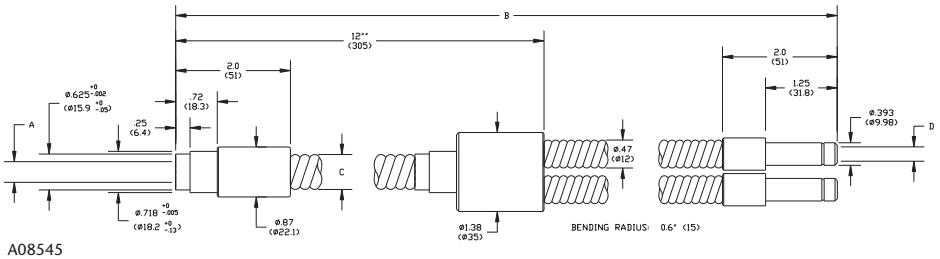
Dimensions in ( ) are in mm

Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

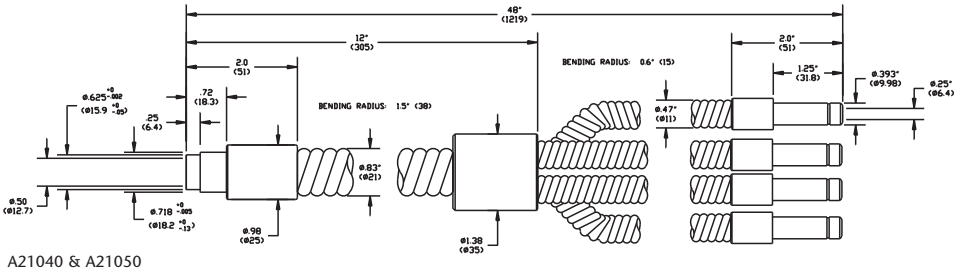
Ringlight Input: Black Anodized Aluminum
Bundle Sheathing: PVC Covered Metal Tubing



A08031.40R - A08031.80R
Single Randomized Bundles



A08545
Quad Flexible Bundles



A21040 & A21050
Dual Randomized &
CalibratedBundles

Matrix for A08031.40R - A08031.80R

Part No.	A	B	C	Bend Radius	D
A08031.40R	.30" (78)	40" (1016)	.47" (12)	.6" (15)	.393" (10)
A08031.60R	.30" (78)	60" (1524)	.47" (12)	.6" (15)	.393" (10)
A08031.80R	.30" (78)	80" (2032)	.47" (12)	.6" (15)	.393" (10)

Matrix for A21040 & A21050

Part No.	A	B	C	Bend Radius	D
A21040	.36" (9)	48" (1219)	.60" (15)	1.0" (25)	.25" (6.4)
A21050	.43" (11)	48" (1219)	.67" (17)	1.2" (30)	.30" (7.6)

Bundle Extenders

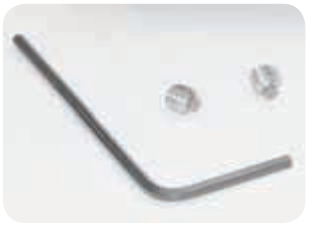
Bundle Extender, A08035

Extend the working length of standard fiber optic components using a SCHOTT bundle and these couplers

- Reduces the requirement for custom fiber optic lengths
- Provides the user with additional work space since the light source can be placed in a more remote area.
- Extends length of all standard SCHOTT ringlights, bundles, goosenecks, lightlines, and backlights* that have a .310" (8) or .510" (13) active fiber diameter
  - Use Part Number A08035 with A08031.40, A08031.40R, A08031.60,A08031.60R, A08031.80, A08031.80R to extend products with an active fiber diameter of .310" (8) or less.
  - Use Part Number A08055 with A08051.40 and A08051.60 to extend products with an active fiber diameter greater than .310" (8) but less than .510" (13).
- Black anodized aluminum with nylon tipped set screws

PLEASE NOTE: Using a bundle extender results in a 30-40% light loss. If your application requires maximum intensity, we recommend ordering a modified standard component.

*Backlight adapter, part number A08931 is required in order for the bundle extender to be used with SCHOTT standard backlights.



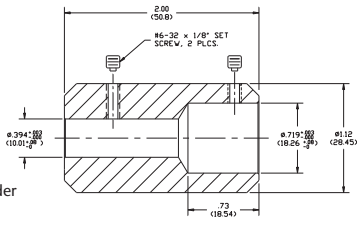
Bundle Extender Nylon Tipped Set Screws

Bundle Extender

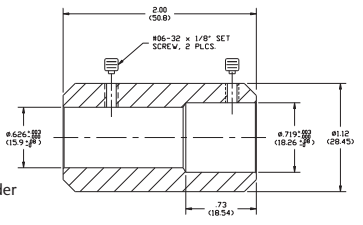
Bundle Extender Part No.	Single Bundle Part No.
A08035	A08031.40
	A08031.60
	A08031.80
	A08031.40R
	A08031.60R
	A08031.80R
A08055	A08051.40
	A08051.60

Bundle Extenders

Dimensions in ( ) are in mm



A08055
Bundle Extender



A08035
Bundle Extender

Single and Dual Goosenecks

Single Black Gooseneck, A08410

Obedient, incident illumination for space constrained applications

- Made with chrome plated semi-obedient metal or black dekabon semi-rigid gooseneck tubing
- The standard output ferrules accept spot lenses with or without polarizing caps. (See Accessories section of the product catalog for details.)
- Model number A08575 is a dual focusing gooseneck that has permanently attached spot lenses. Easily focused by turning the knurled lens barrel(s).
- Custom configurations are available. Lead time is required.
- Precise positioning offers complete control of light placement.
- Gooseneck legs placed in opposing positions create near shadow-free illumination.
- Easily adjustable
- Dual models illuminate workspace with a single light source.

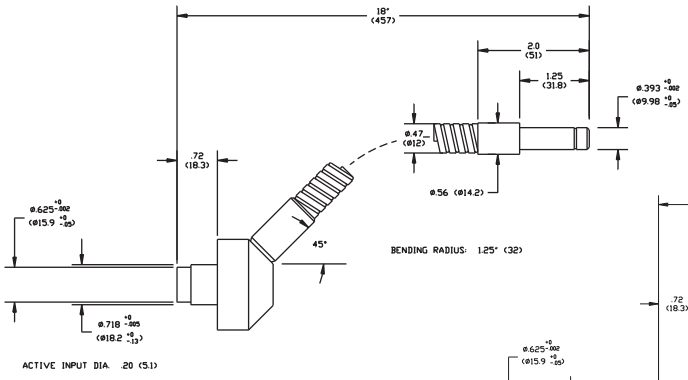
Dual Chrome Gooseneck, A08500

Single and Dual Goosenecks

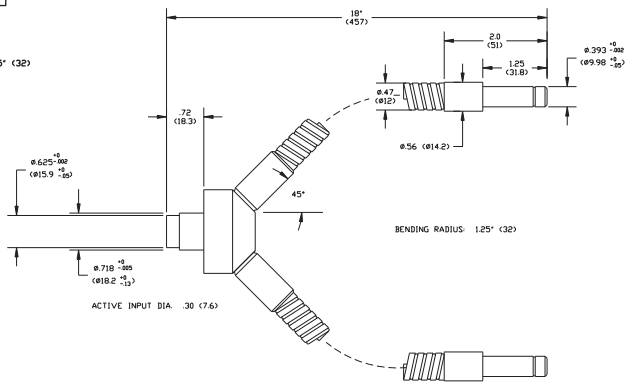
Dimensions in ( ) are in mm

Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

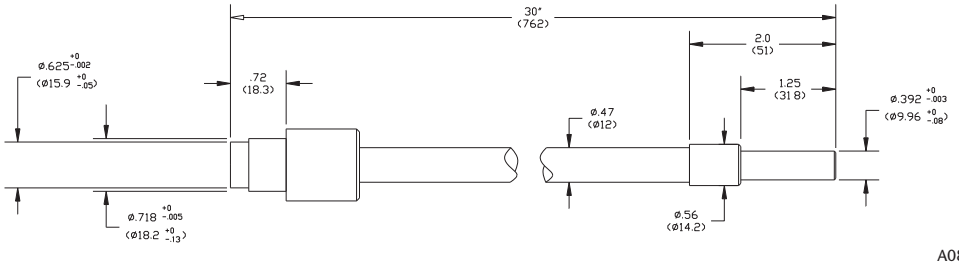
Ringlight Input: Black Anodized Aluminum
Bundle Sheathing: Chrome or Black Decabon



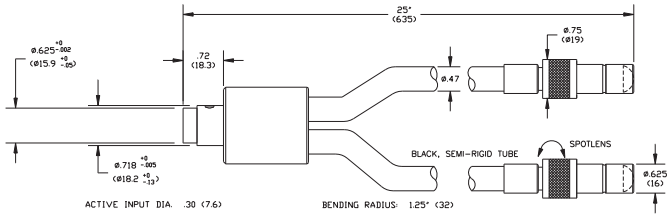
A08500
Dual Chrome Gooseneck



A08400
Single Chrome Gooseneck



A08575
Dual Black Gooseneck



A08410
Single Black Gooseneck

Goosenecks

Part No.	Tubing	Distal Ferrule Diameter	Active Input Fiber Diameter	Gooseneck Tubing Diameter	Gooseneck Length
Single					
A08400	Chrome	.20" (5)	.393" (10)	.47" (12)	18" (457)
A08410	Black	.20" (5)	.393" (10)	.47" (12)	30" (762)
Dual					
A08500	Chrome	.30" (8)	.393" (10)	.47" (12)	18"(457)
A08575	Black	.30" (8)	.21" (5)	.47" (12)	23" (584)

Dimensions in ( ) are in mm

Combination Goosenecks & Bundles

Combination Dual Gooseneck with Bundle, A08520

Obedient, incident illumination for space constrained applications

- The bundle sheathing is made of PVC covered metal tubing and the gooseneck is made of semi-obedient, chrome-plated metal gooseneck tubing.
- Bend radius of the chrome gooseneck tubing is 2-3" (51 - 76)*.
- The standard output ferrules accept spot lenses with or without polarizing caps. (See Accessories section of the product catalog for details.)
- Custom configurations are available. Lead time is required.
- Precise positioning of a spot of light
- Gooseneck legs placed in opposing positions create shadow-free illumination.
- Re-adjust with ease
- Dual models illuminate a workspace with a single light source.

Combination Gooseneck, Bundle, and Bracket, A08512 for Olympus SZX Series Microscopes

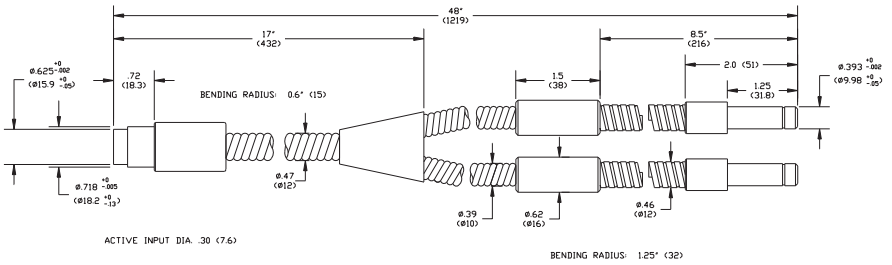
Combination Goosenecks & Bundles

Dimensions in ( ) are in mm

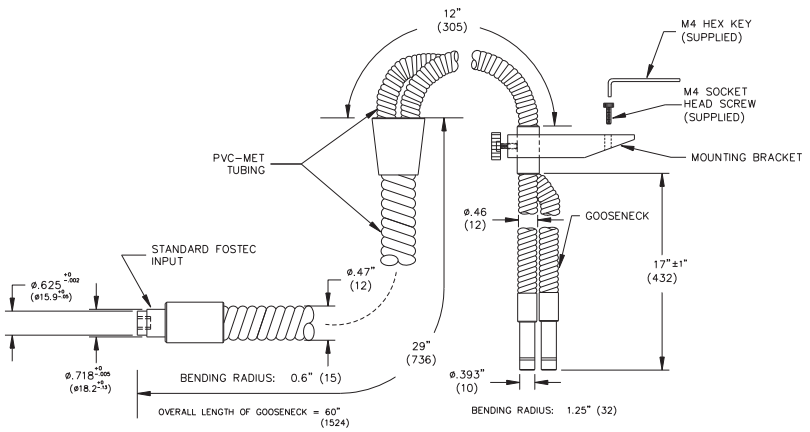
Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

Ringlight Input: Black Anodized Aluminum
Bundle Sheathing: PVC Covered Metal Tubing
Gooseneck Sheathing: Chrome Plated Steel

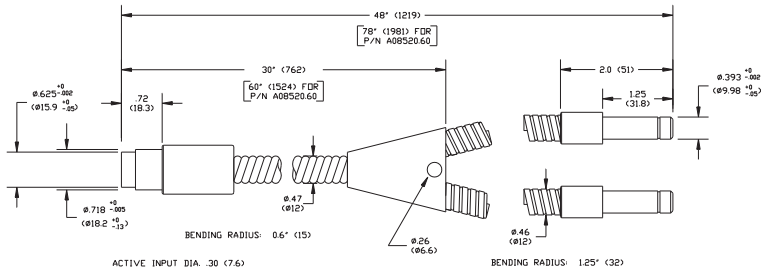
A08510
Combination Gooseneck and Bundle



A08512
Combination Gooseneck and Bundle



A08520 - A08520.60
Combination Gooseneck and Bundle



Combination Goosenecks and Bundles

Part No.	Active Input Fiber	Active Output Fiber Diameter	Bundle Tubing Diameter	Gooseneck Tubing Diameter	Bundle Length Diameter	Gooseneck Length
Combination Goosenecks and Bundle(s)						
A08510	.30" (8)*	.21" (5)	.47" (12)	.46" (12)	17" (432)	8.5"(216)
A08512	.30" (8)	.21" (5)	.47" (12)	.46" (12)	29" (737)	17"(432)
A08520	.30" (8)	.21" (5)	.47" (12)	.46" (12)	30" (762)	18"(457)
A08520.60	.30" (8)	.21" (5)	.47" (12)	.46" (12)	60" (1524)	18"(457)

Dimensions in ( ) are in mm

Gooseneck & Bundle Support Apparatus

A08522

For accurate positioning in both industrial and laboratory environments

Support Apparatus

Part No.	Desscrripttion
A08508	Bundle holder with .565" (14.4) dia. hole for all bundle diameters up to .51" (13). Has an M6 thread.
Universal Post Clamps	
★ **A08522**	Ring for 18 mm post. Zeiss IVB Stereo, IB, III, IV, IVB
★ **A08523**	Ring for 20 mm
★ **A08524**	Ring for 24.5 mm
★ **A08525**	Ring for 25 mm
★ **A08526**	Ring for 32 mm
★ **A08527**	Ring for 22 mm
★ **A08528**	Ring for 29 mm

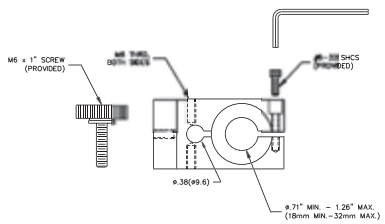
★ Made-to-order products.

A08508

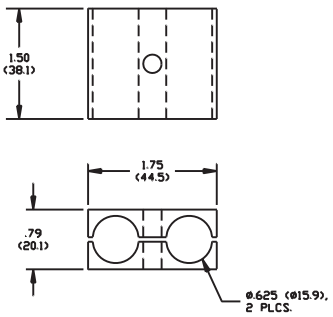
Gooseneck & Bundle Support Apparatus

Dimensions in ( ) are in mm

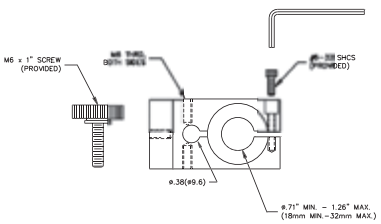
A08522



A08502
Clamp Set



A08522 - A08528
Clamps



Support Apparatus

Articulated Arm, A08505

For accurate positioning when using fiber optic components in industrial and laboratory environments.

Support Apparatus

Part No.	Description
A08505	Articulated arm with M6 thread on one end (will attach to heavy base and V-clamp) and M8 thread on the other end which will fit our A08592 dual V-clamp.
A08506	Articulated arm with M6 threads on both ends. Versatile accessory easily locked into place with only one knob. Can be used with our base and V-clamp and will accept all holders.
A08507	3 1/2 lb. Base for attaching up to three support arms and/or posts at once. M6 threads only.
A08590	Spring Clamp with M6 thread. Industrial strength universal clamp that can be used with our articulated arms to hold bundles, light lines and other equipment. Secure to tabletops or other like sur faces.
A08591	V-Clamp with two M6 threaded holes to use as a table clamp and will accept all our holders.

Articulated Arm, A08506

Spring Clamp, A08590

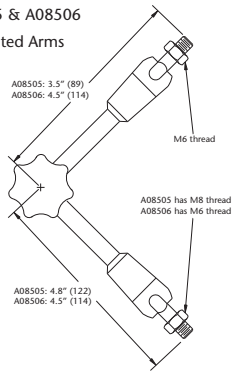
Base, A08507

Bundle Extender Nylon Tipped Set Screws

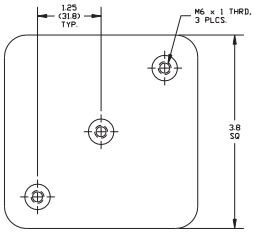
Support Apparatus

Dimensions in ( ) are in mm

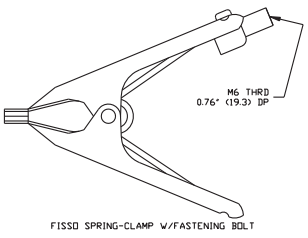
A08505 & A08506
Articulated Arms



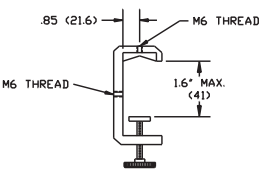
A08507
Base



A08590
Spring Clamp



A08591
V-Clamp



Filters, Diffusers & Spot Lenses

Color Filters, A08070-A08074

Filters and Adapter

- Available in red, green, blue, yellow, and daylight. These Dichroic filters will not darken or alter spectral response over time, regardless of light intensity or duration. The daylight filter increases existing color temperature to approximately 3000 K when used with EKE, EJA, and DDL lamps at their rated voltages.
- Dichroic color filters reflect heat versus absorbing it, eliminating the need for a thermal expansion split.
- Clear anodized aluminum housing is used on the filters. Black anodized aluminum housing is used on the adapter.

Diffusers

- Input lens diffuser, part number, A08086, homogenises beam with minimal light loss and minimizes black hole phenomenon from fiber bundles.
- Opal diffuser option, part number, A08087, creates the most uniform light - almost flat illumination, but reduces output by 40%.
- Diffusers fit on all ColdVision standard inputs.

Spot Lenses

- Used on distal ends of goosenecks and bundles to focus the light

A08931 Color Filter Adapter

A08087 & A08086 Input Lens Diffusers

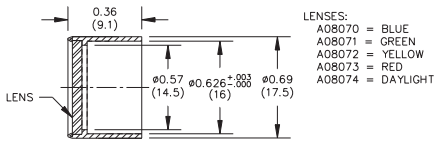
Spot lens models, A08080,A08084, A08082

Polarizing cap, A08090, for spot lens, A08080

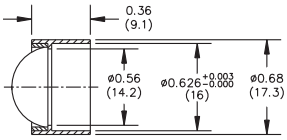
Filters, Diffusers & Spot Lenses

Dimensions in ( ) are in mm

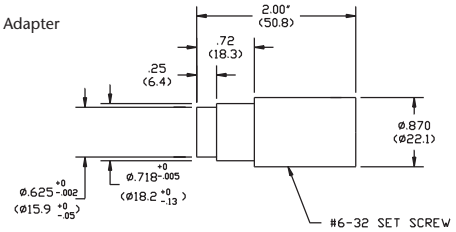
A08070 - A08074
Dichroic Color Filters



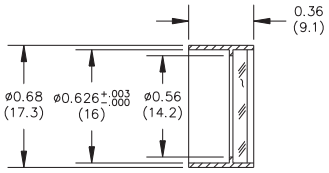
A08086
Input Lens Diffuser



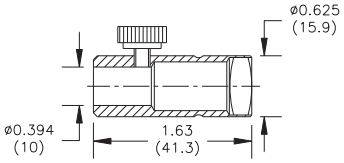
A08931
Color Filter Adapter



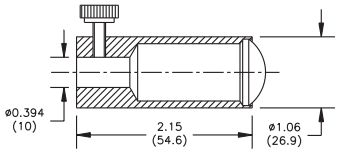
A08087
Input Opal Diffuser



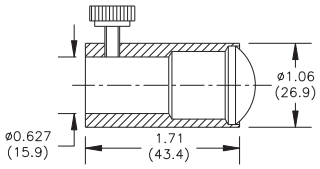
A08080
Spot Lens



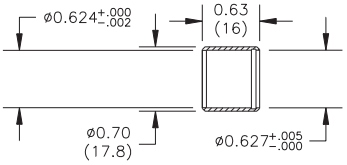
A08082
Small Spot Lens



A08084
Spot Lens



A08090
Polarizing Cap



Part No.	First Spot Location	First Spot Diameter	Second Spot Location	Second Spot Diameter
A08080	40 mm	45 mm	80 mm	90 mm
A08082	40 mm	30 mm	80 mm	60 mm
A08084	40 mm	30 mm	80 mm	60 mm

- Polarizing cap, part number, A08090, is available for spot lens model, A08080, to eliminate glare and reflections. Five spare polarizing discs are included with the product.

Filters, Diffusers & Spot Lenses

Part No.	Description		
Dichroic Color Filters & Adapter			
A08070	Blue	**A08073** Red	**A08931** Color Filter Adapter
A08071	Green	**A08074** Daylight	
A08072	Yellow	**A08075** UV Filter, Cut-off	
Diffusers			
A08086	Input lens diffuser		
A08087	Input opal diffuser		
Spot Lenses			
A08080	Spot lens for std. bundles except A08051.40 & A08051.60		
A08082	Small spot lens for std. bundles except A08051.40 & A08051.60		
A08084	Spot lens for models A08051.40 & A08051.60		
Polarizing Cap (for A08080)			
A08090	Polarizing cap for A08080 (fits on A08575)		

Lightlines, 1", 2", & 3"

1" (25) Dual Lightline, A08579

Alternative to round fiber optic bundles for narrower and elongated illumination for Microscopy and Inspection applications

- Small, uniform field of view
- Narrow body design and offset position of the line on 1" (25) and 2" (51) bodies allows close positioning for darkfield effect.
- 3"(76)* models are calibrated with DDL-bulb to ±8 gray scale levels at a mean of 200 with a gamma setting of 1.0 to deliver optimum uniformity (see chart). Uniformity of 1"(25) and 2"(51) lines is better than ±8 gray scales. Refer to section25.02.01 for more information on uniformity of fiber optic products.
- Standard input ferrule fits ColdVision Series light sources. Can also be used with strobes.
- Rugged aluminum body and light source ferrule with black anodized finish. PVC covered metal tubing protects the fiber bundle.
- M6 threads are provided on the 1"(25) and 2"(51) lightline bodies for easy mounting. See drawing on back.
- Lightline holders and support products available in Support Apparatus for Lightlines section of the product catalog
- Custom lengths, bundle exits, multiple combinations (dual, quad, etc.) and line widths can be designed for your unique requirements. In addition, combine lightlines with other fiber optic components in a single input to create unique lighting effects. Lead-time required.
- Cylindrical and apertured lenses are available as standard products for most lightline models. They can be custom made for all models.

One leg of Dual or Quad 3" (76) Lightline with Cylindrical Lens

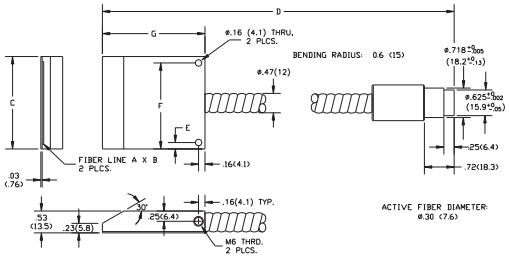
Lightlines, 1", 2", & 3"

Dimensions in ( ) are in mm

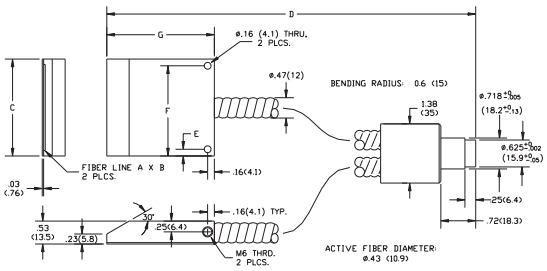
Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

Input: Black Anodized Aluminum
Body: Black Anodized Aluminum
Sheathing: PVC Covered Metal Tubing

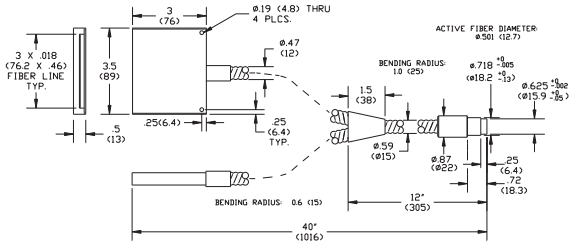
A08588 & A08589
Single Lightlines



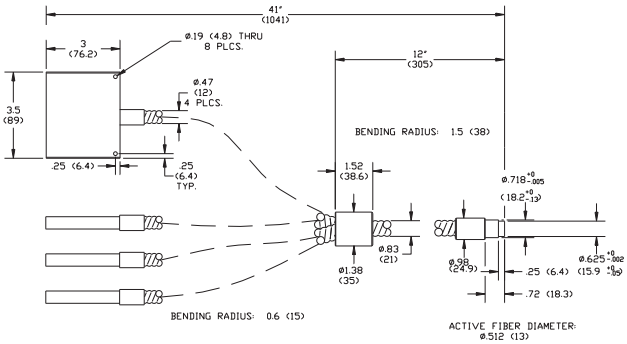
A08579 & A08583
Dual Lightlines



A08580
Dual Lightline



A08584
Quad Lightline



Lightlines, 1", 2", & 3" and Lenses

Part No.	Line Dimensions Length x Width	Input Active Fiber Dia.	Gray Scale Uniformity^	Part No. for Lens Cylindrical	Apertured
Single line configuration w/36" bundle length					
A08588	1" x .070" (25 x 1.8)*	.30" (7.6)	< ± 8	★ A08571	★ A08573
A08589	2" x .035" (51 x .89)	.30" (7.6)	< ± 8	★ A08572	★ A08574
Dual line configuration w/36" bundle length					
A08579	1" x .070" (25 x 1.8)	.43" (10.9)	< ± 8	A08571	A08573
A08583	2" x .035" (51 x .89)	.43" (10.9)	< ± 8	A08572	A08574
A08580	3" x .018" (76 X .46)	.36" (9.1)	± 8	A08582	Custom
Quad line configuration w/36" bundle length					
A08584	3" x .018" (76 X .46)	.51" (13.0)	± 8	★ A08582	Custom

★ Made-to-order products.

^ Gamma setting of 1.0
Dimensions in ( ) are in mm

Matrix for A08588 & A08589 Lightlines

Part No.	A	B	C	D	E	F	G
A08588	1"(25)	.07"(1.8)	1.25"(31.8)	38"(965.2)	.16"(4.1)	1.1"(28)	2"(50.8)
A08589	2"(51)	.035"(.89)	2.25"(57.2)	38.5"(978)	.16"(4.1)	2.1"(53)	2.5"(63.5)

Matrix for A08579 & A08583 Lightlines

Part No.	A	B	C	D	E	F	G
A08579	1"(25)	.07" (1.8)	1.25"(31.8)	38"(965.2)	.16"(4.1)	1.1"(28)	2"(50.8)
A08583	2"(51)	.035"(.89)	2.25"(57.2)	38.5"(978)	.16"(4.1)	2.1"(53)	2.5"(63.5)

Lightlines

12" Lightline, A08912

Uniform lines of light ideal for Machine Vision and line scan applications

- Calibrated with DDL-bulb to a specified number of gray scale levels (see chart below) at a mean of 200 with a gamma setting of 1.0 to deliver optimum uniformity. Refer to section 25.02.01 for information on uniformity of fiber optic products.
- Assembly method accurately positions the fiber line within the body on all three planes, to a tolerance of ± .004"(0.1)†. The technique assures the fiber axis will be parallel with the mounting surface of the body.
- Fiber bundle exit locations include back-side (standard exit), back-center, and true-side
- Standard input ferrule fits ColdVision Series light sources. Can also be used with strobes.
- Rugged aluminum body with black anodized finish
- PVC covered metal or stainless steel tubing protect the fiber bundle.
- Lightline holders and support products available
- Custom lengths, bundle exits, line widths, and multiple combinations (dual, quad, etc.) can be designed for your unique requirements. Lead time required.
- Cylindrical and apertured lenses are available as standard products for most lightline models. They can be custom made for all models.

Dual Lightines, A08975

Apertured Lens, A08806, Cylindrical Lens, A08826

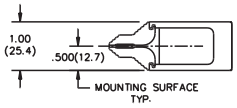
Lightlines

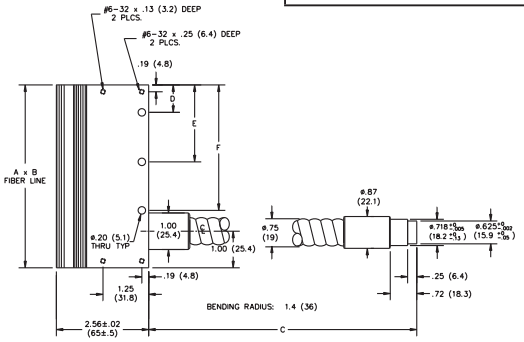
Dimensions in ( ) are in mm

Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

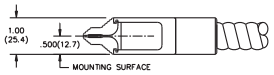
Input: Black Anodized Aluminum
Body: Black Anodized Aluminum
Sheathing: PVC Covered Metal Tubing

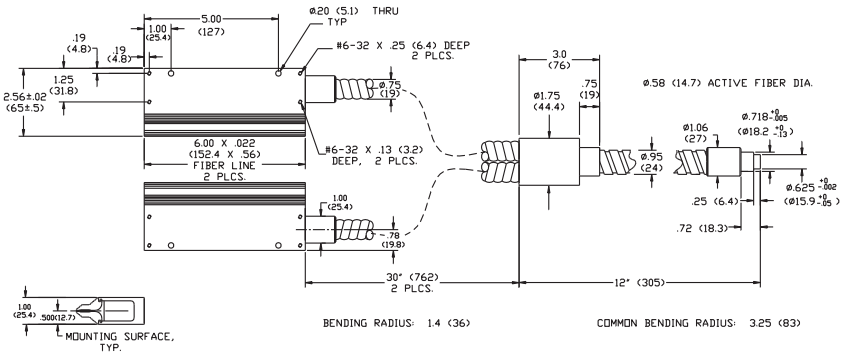
A08903 – A08916
Lightlines





A08975
Dual Lightline





Lightlines and Lenses

Part No.	Line Dimensions	Input Active Fiber Dia.	Gray Scale Uniformity^	P/N Lens	
	Length x Width			Cylindrical	Apertured
Single line configuration w/30"bundle length and back-side single exit					
A08903	3" x .040" (76 x 1.02)	.39" (10)†	± 8	★**A08823**	★**A08803**
A08904	4" x .036" (102 x .91)	.43" (11)	± 8	★**A08824**	★**A08804**
A08905	5" x .040" (127 x 1.02)	.51" (13)	± 8	★**A08825**	★**A08805**
A08906	6" x .033" (152 x .84)	.51" (13)	± 8	★**A08826**	★**A08806**
★**A08907***	7" x .029" (178 x .74)	.51" (13)	± 8	★**A08827**	**Custom**
A08908	8" x .025" (203 x .64)	.51" (13)	± 8	★**A08828**	★**A08808**
★**A08909***	9" x .022" (229 x .56)	.51" (13)	± 8	★**A08829**	**Custom**
A08910	10" x .020" (254 x .51)	.51" (13)	± 8	★**A08830**	★**A08810**
★**A08911***	11" x .018" (279 x .46)	.51" (13)	± 8	★**A08831**	**Custom**
A08912	12" x .016" (305 x .41)	.51" (13)	± 8	★**A08832**	★**A08812**
★**A08913***	13" x .015" (330 x .38)	.51" (13)	± 10	★**A08833**	**Custom**
Custom	14" x .014" (356 x .36)	.51*(13)	± 10	★**A08834**	**Custom**
★**A08915***	15" x .013" (381 x .33)	.51" (13)	± 10	★**A08835**	**Custom**
A08916	16" x .012" (406 x .30)	.51" (13)	± 10	★**A08836**	★**A08816**
Dual line configuration w/true-side bundle exit (see photo above)					
A08975	6" x.022" (152 x .56)	.58" (16)	± 8	**A08826**	**A08806**

★ Made-to-order products.

* Items are made to order, and may require additional 3-4 weeks delivery.^ Gamma setting of 1.0
†Dimensions in ( ) are in mm

Matrix for A08903 - A08916 Lightline Drawing

Part No.	A	B	C	D	E	F
A08903	3" (76)	.040" (1.0)	30" (762)	.75" (19.1)	1.5" (39)	n/a
A08904	4" (102)	.036" (.91)	30" (762)	.75" (19.1)	2.5" (64)	n/a
A08905	5" (127)	.040" (1.02)	30" (762)	.75" (19.1)	3.5" (89)	n/a
A08906	6" (152)	.033" (.84)	30" (762)	.75" (19.1)	4.5" (114)	n/a
A08907	7" (178)	.029" (.74)	30" (762)	.75" (19.1)	5.5" (140)	n/a
A08908	8" (203)	.025" (.64)	30" (762)	.75" (19.1)	6.5" (165)	n/a
A08909	9" (229)	.022" (.56)	30" (762)	.75" (19.1)	7.5" (191)	n/a
A08910	10" (254)	.020" (.51)	30" (762)	.75" (19.1)	8.5" (216)	n/a
A08911	11" (279)	.018" (.46)	30" (762)	.75" (19.1)	9.5" (241)	n/a
A08912	12" (305)	.016" (.41)	30" (762)	.75" (19.1)	10.5" (267)	n/a
A08913	13" (330)	.015" (.38)	30" (762)	.75" (19.1)	6.13" (156)	11.5"(292)
Custom	14" (336)	.014" (.38)	30" (762)	.75" (19.1)	6.63" (168)	12.5"(316)
A08915	15" (381)	.013" (.33)	30" (762)	.75" (19.1)	7.13" (181)	13.5"(343)
A08916	16" (406)	.012" (.30)	30" (762)	.75" (19.1)	7.63" (194)	14.5"(368)

Spatially Randomized Lightlines

Continuous Lightline, A08940

A patented exclusive! 24" and 40" lines of for web and line scanning applications

- Manufactured using a patented process called spatial randomization. The process allows light from each input to be distributed over the entire length of the line. Therefore, should a light source fail while using multiple inputs, intensity is evenly reduced over the length of the line, rather than losing all light in a section of the line.
- Calibrated to ±15 gray scale levels at a mean of 200 with a gamma setting of 1.0 to deliver optimum uniformity. Refer to section 25.02.01for information on uniformity of fiber optic products.
- Assembly method accurately positions the fiber line within the body on all three planes, to a tolerance of ± .004" (.1)*. The technique assures the fiber axis will be parallel with the mounting surface of the body.
- Standard input ferrule fits ColdVision Series light sources. Can also be used with strobes.
- The 24" (610) lightline accepts our dichroic filters and diffusers. To use color filters on the 40" (1016) line, part number A08931, color filter adapter, is required.
- Rugged aluminum body with a black anodized finish
- Stainless steel tubing protects the fiber bundle.
- Cylindrical lenses are available. They are designed to collect light exiting the lightline to increase intensity up to a factor of 10.
- Custom length, bundle exits, line widths and configuration are available. (Additional lead time required)

Continuous Lightine, A08964

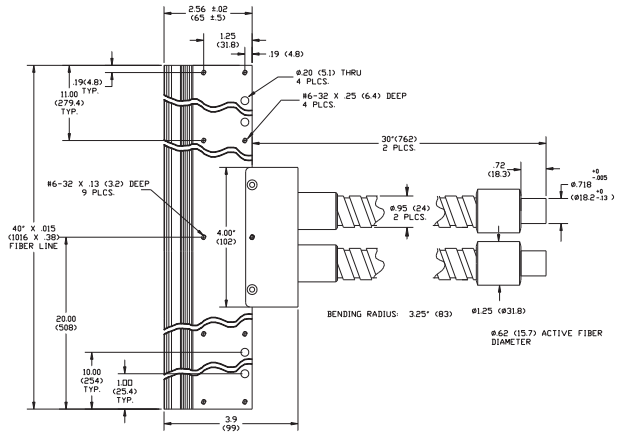
Spatially Randomized Lightlines

Dimensions in ( ) are in mm

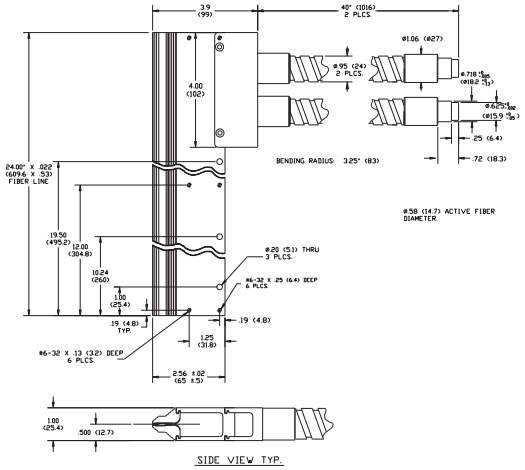
Warning : This product is manufactured with glass fiber. Not for use in cable/hose carrier. Call SCHOTT to discuss moving cable/hose carrier applications.

Input: Black Anodized Aluminum
Body: Black Anodized Aluminum
Sheathing: Stainless Steel Covered Metal Tubing

A08940
40″ (1016) Lightline



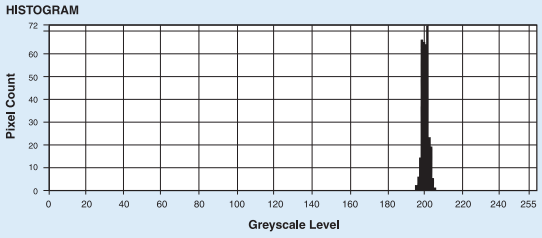
A08964
24″ (610) Lightline



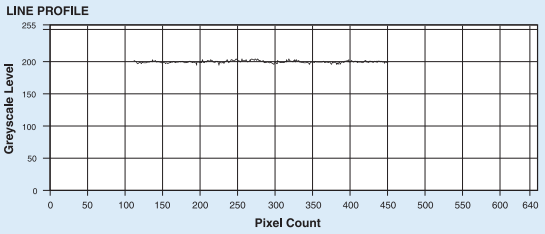
Global Report

Mean Value	Maximal Value	Minimal Value	Standard Variation	Area (pixels)	%
199.78	205.00	195.00	1.74	337	1.40

Histogram



Example of Line Scan Results



Lightlines and Lenses

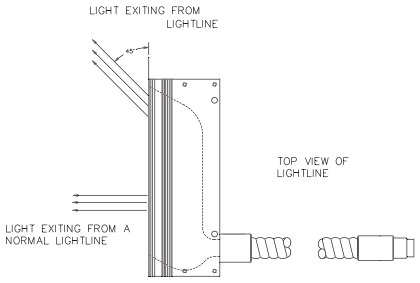
Part No.	Line Dimensions Length x Width	Input Active Fiber Dia.	Gray Scale Uniformity	Bundle Length	Part No. for Lens	
					Cylindrical	Apertured
A08940	40″x.015″ (1016x.38)	.62″ (16)*	± 15	30″ (762)	★ A08860	Custom
A08964	24″x.022″ (610x.56)	.57″ (14)	± 15	40″ (1016)	★ A08864	Custom

★ Made-to-order products.

Lightline, 45°

Engineered and designed to emit light at a 45° angle along the length of the line

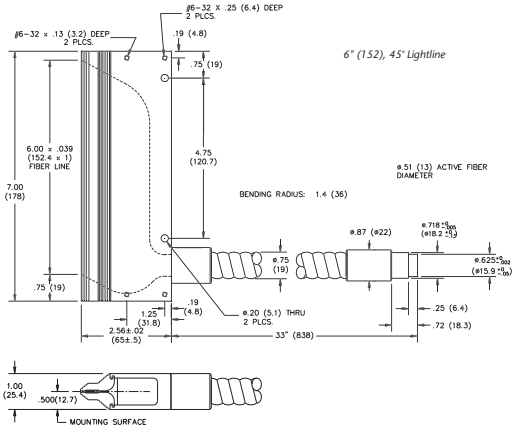
- The output fibers are angled 30° to the nosepiece, as a result they are polished on a bias, which causes emitted light to exit at 45° to the nosepiece. The line can be positioned off-axis to the object, illuminate the field-of-view without loss of uniformity, while avoiding interference with the camera; an important consideration in space constrained systems.
- Useful for illuminating a rectangular surface area where the features are perpendicular to the line body.
- Standard input ferrule fits ColdVision Series light sources. Can also be used with strobes.
- The lightline is calibrated to ± 8 gray scales at a mean of 200 with a gamma setting of 1.0, for optimum uniformity with DDL-lamp.
- Assembly method accurately positions the fiber line within the body on all three planes, to a tolerance of ± .004"(.102). The technique assures the fiber axis will be parallel with the mounting surface of the body.
- Rugged aluminum body with black anodized finish
- PVC covered metal tubing protects the fiber bundle.
- Refer to section 25.02.01 for more information on uniformity of fiber optic products.
- Custom configurations can be engineered for unique requirements.
- The cylindrical and apertured lenses are adjustable and easy to attach.



Lightline, 45°

Dimensions in ( ) are in mm

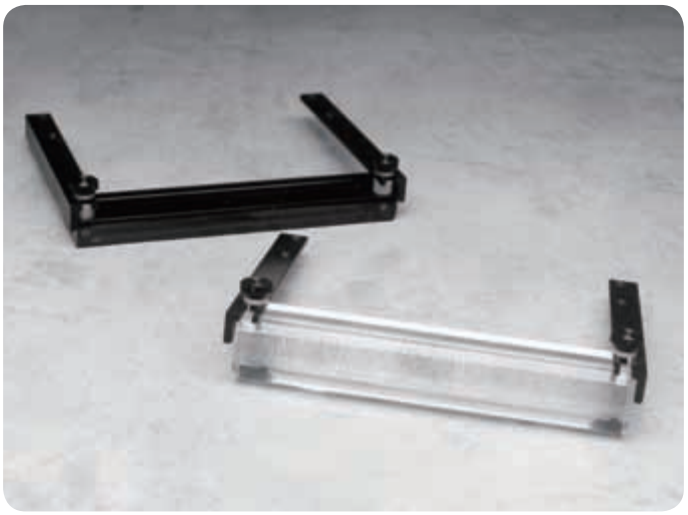
Input: Black Anodized Aluminum
Body: Black Anodized Aluminum
Sheathing: PVC Covered Metal Tubing



Lightline, 45°

Part No.	Line Dimensions	Input Active Fiber Dia.	Gray Scale Uniformity^	Part No. for Lens	
	Length x Width			Cylindrical	Apertured
Custom	6" x .039" (152 x 1.0)	.51" (13)	±8	Custom	Custom

Lightline Lenses



Cylindrical and apertured lenses, A08806 & A08826

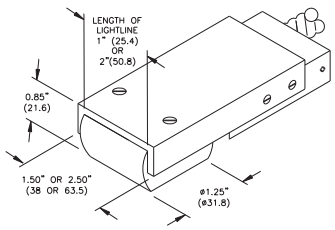
Cylindrical and apertured lenses for 1" to 16" lightlines

- Cylindrical and apertured lenses are available as standard products for most lightline models. They can be custom made for all models.
- Cylindrical lens attachments are designed to collect light exiting the lightline to increase intensity up to a factor of 10.
- Apertured lens attachments are designed to project a more collimated line of light, not to increase light intensity.
- The lenses are adjustable and easily attach to SCHOTT lightlines.
- Custom length and configurations are available. Lead time is required.

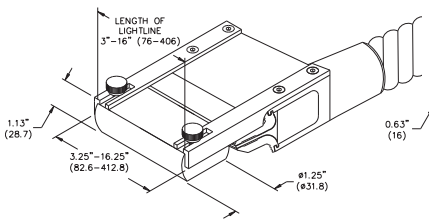
DCR® III Light Source

Dimensions in ( ) are in mm

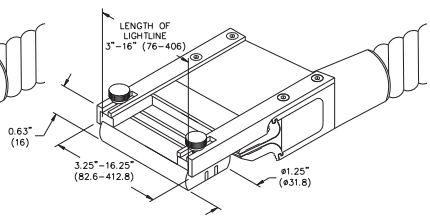
A08571
Cylindrical and Apertured Lenses



A08824, A08826, A08832
Cylindrical Lenses



A08806
Apertured Lenses



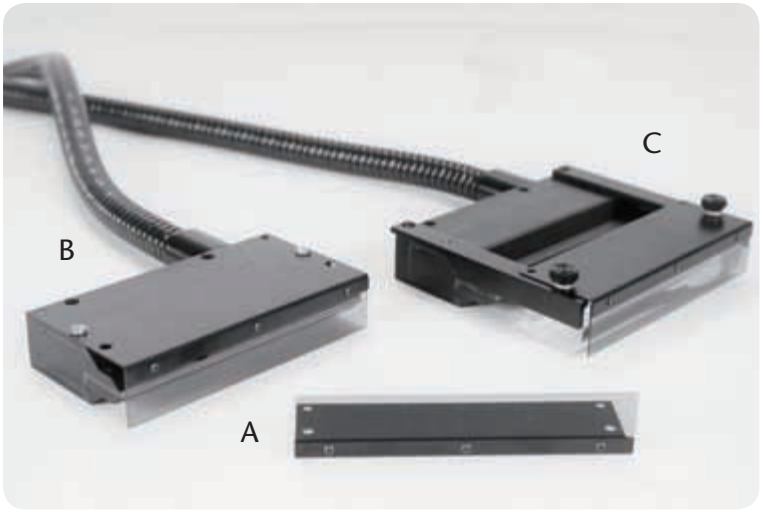
3" (76 mm) Lightline with A08582 Cylindrical Lens

Lenses and Polarizer Kits

Lightline Part No.	Lens Part No.	
	Cylindrical	Apertured
1", 2", & 3" Lightlines		
A08579	★ A08571	Custom
A08580	★ A08582	Custom
A08583	★ A08572	Custom
A08584	A08572	Custom
A08588	A08571	Custom
A08589	A08572	Custom
3" to 16" Continuous Lightlines		
A08903	A08823	Custom
A08904	A08824	Custom
A08905	A08825	Custom
A08906	A08826	Custom
A08907	A08827	Custom
A08908	A08828	Custom
A08909	A08829	Custom
A08910	A08830	Custom
A08911	A08831	Custom
A08912	A08832	Custom
A08913	A08833	Custom
A08914	A08834	Custom
A08915	A08835	Custom
A08916	A08836	Custom
A08975	A08826	A08806
24" to 40" Continuous Lightlines		
A08940	A08860	Custom
A08964	A08864	Custom
45 Degree Lightline		
Custom	Custom	Custom

★ Made-to-order products.

Lightline Linear Polarizer Kits



(A) Lightline polarizer assembly, A08845, (B) Polarizer affixed to a 5" lightline, (C) Polarizer affixed to a cylindrical lens on a lightline

- Developed for use with 3" to 16" (227 to 406 mm) lightlines to enhance contrast on highly reflective surfaces for area and line scanning applications.
- Easily mount on SCHOTT lightlines alone or with cylindrical and apertured lenses affixed to the lightline.
- The polarizer(s) should be used with an analyzer supplied by the customer. The analyzer is typically attached to the camera objective.
- Two polarizers are included in the kit; one polarizes in the horizontal axis and the other polarizes in the vertical axis.
- Custom length configurations are available. Lead time is required.

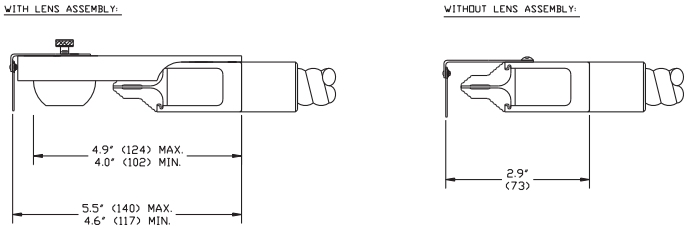
Linear Polarizer Kits

Lightline Part No.	Polarizer Kits Part No.
A08903	Custom
A08904	★ A08844
A08906	Custom
A08908	Custom
A08910	Custom
A08912	Custom
A08914	Custom
A08916	Custom
A08975	Custom

★ Made-to-order products.

DCR® III Light Source

Dimensions in ( ) are in mm



A08843 - A08856
Polarizers

Lightlines Support Apparatus

3" Lightline, A08903, with Holder, A08901, supported by an articulated arm, A08506, and base, A08507

For accurate positioning in both industrial and laboratory environments

Support Apparatus

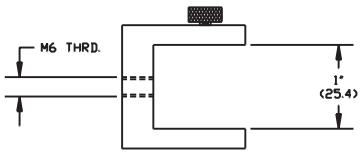
Part No.	Description
A08901	**Lightline holder** with M6 thread. Will support 3" (76) to 10" (254) single lightlines when attached to an articulated ard and base.

Lightline Holder, A08901

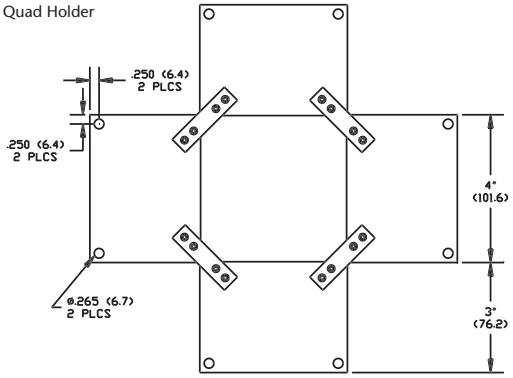
Lightlines Support Apparatus

Dimensions in ( ) are in mm

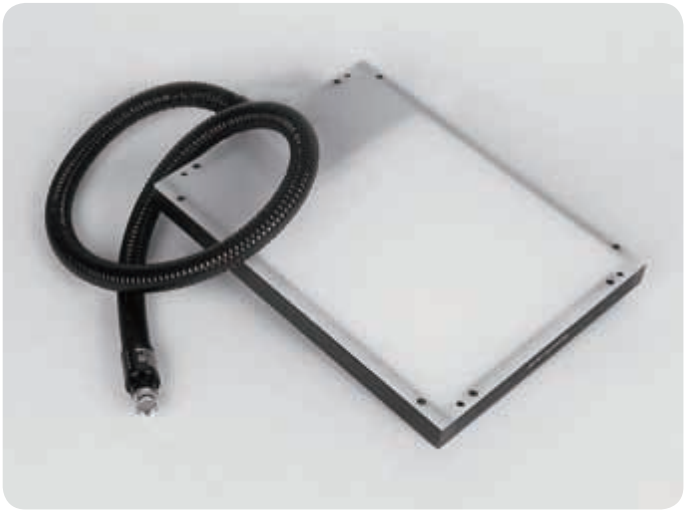
A08901
Holder



Quad Holder



Single and Dual Backlights



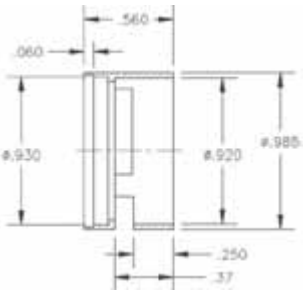
8" x 8" Backlight, A08927

Patented SCHOTT Backlights are calibrated to provide bright, even illumination for Microscopy and Machine Vision applications.

- Calibrated with DDL-bulb from ±13 to ±15 gray scale levels at a mean of 200, gamma setting of 1.0, using a patented process to create diffuse, uniform illumination within the active area. Uniformity scans are available upon request.
- The white acrylic diffuser plate provides the optimum combination of uniformity and intensity. The backlight housing is made of rugged, black anodized aluminum. The plastic fiber bundle is protected with flexible PVC covered metal tubing.
- Use with strobes and ColdVision Series light sources. Other sources, particularly those without an IR filter, may damage the plastic fibers.
- ColdVision dichroic color filters can be used on the products in conjunction with the A08931 backlight color filter adapter (see photo to left). More details can also be found in the Fiber Optic Accessory section of the product catalog.
- IR - Filter in every unit
- Compact, low profile housing fits in small spaces.
- Can be used to create a crisp edge definition, or soft, diffuse incident light
- Dual and quad backlights increase lighting versatility. Additional combinations and sizes can be custom ordered.

Dual 2" x 2" Backlight, A08922

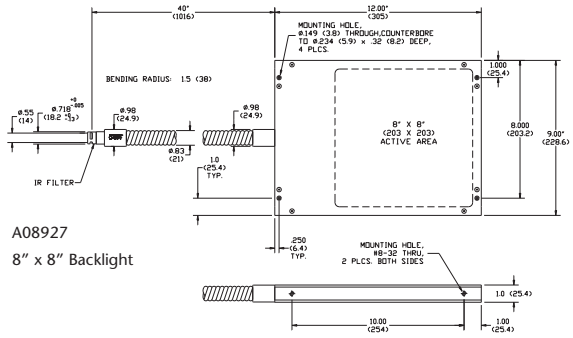
IR Filter A08921 with measurements



Single and Dual Backlights

Dimensions in ( ) are in mm

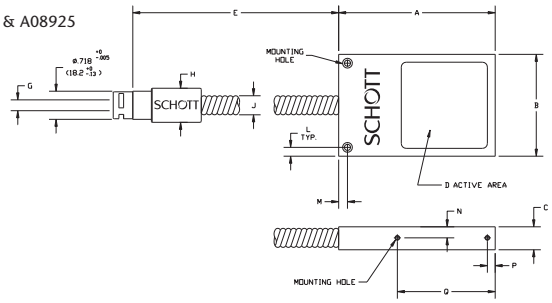
Input: Black Anodized Aluminum
Bundle Sheathing: PVC Covered Metal Tubing
Max Fiber Temperature: 70°

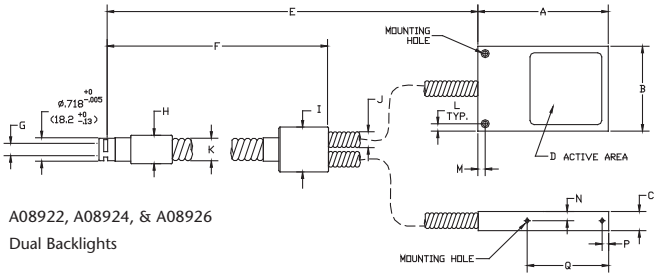

40" (1016)
12.00" (305)
MOUNTING HOLE, ø.149 (3.8) THROUGH,COUNTERBORE TO ø.234 (5.9) x .32 (8.2) DEEP, 4 PLCS.
BENDING RADIUS: 1.5 (38)
8" X 8" (203 X 203) ACTIVE AREA
1.000 (25.4)
8.000 (203.2)
9.00" (228.6)
IR FILTER
1.0 (25.4) TYP.
.250 (6.4) TYP.
MOUNTING HOLE, #8-32 THRU, 2 PLCS. BOTH SIDES
10.00 (254)
1.00 (25.4)

A08927
8" x 8" Backlight

Warning : The IR filter on the input protects the fibers from damage caused by IR absorption.

A08920, A08923, & A08925
Single Backlights





A08922, A08924, & A08926
Dual Backlights

Backlights

Part No.	Active Area	Housing Dimensions	Gray Scales	Bundle Length	Common Bundle Length
Single Configuration					
A08920	2" x 2" (51 x 51)	4" x 2.6" x .59" (102 x 66 x 14.9)	±13	40" (1016)	N/A
A08923	3" x 3" (76 x 76)	6" x 3.5" x .75" (152 x 89 x 16)	±13	40" (1016)	N/A
A08925	4" x 4.88" (102 x 124)	9" x 5" x .78" (229 x 127 x 19.7)	±13	40" (1016)	N/A
A08927	8" x 8" (203 x 203)	12" x 9" x 1" (305 x 229 x 25.4)	±15	40" (1016)	N/A
Dual Configuration					
A08922	2" x 2" (51 x 51)	4" x 2.6" x .59" (102 x 66 x 14.9)	±13	42" (1067)	10" (254)
A08926	4" X 4.88" (102 X 124)	9" X 5" X .78" (229 X 127 X 19.7)	±13	37" (940)	10" (254)

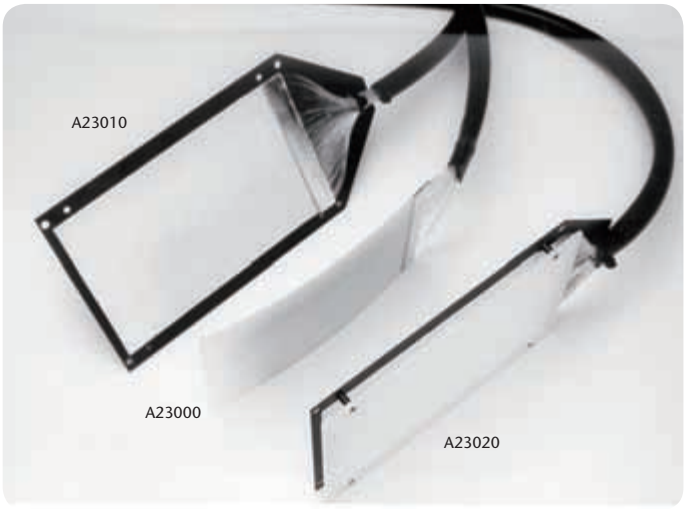
Matrix for Single and Dual Backlights

Part No.	Housing Dimensions LX W X H	Active Area	Overall Bundle Length
Ref. Letter	**A, B, C**	**D**	**E**
A08920	4"x2.6"X.59" (102x66x14.9)	2"X2" (51x51)	40" (1016)
A08922	4"x2.6"x.59" (102x66x14.9)	2"x2" (51x51)	42" (1067)
A08923	6"x3.5"x.75" (152x89x19.1)	3"x3" (76x76)	40" (1016)
A08924	6"x3.5"x.75" (152x89x15.9)	3"x3" (76x76)	40" (1016)
A08925	9"x5"x.78" (229x127x19.7)	4"x4.88" (102x124)	37" (940)
A08926	9"x5"x7.8'' (229x127x19.8)	4"x4.88" (102x124)	37" (940)

Matrix for Single and Dual Backlights (Continuation)

Part No.	Common Bundle Length	Active Input Dia.	Ferrule Dia	Coupler Dia	Tubing Dia	Top Mounting Hole Location	Top Mounting Hole Dimensions	Side Mounting Hole Location	Side Mounting Hole Dimensions	Bend Radius
Ref. Letter	**F**	**G**	**H**	**I**	**JK**	**L/M**	**THRU/DIA/C'BORE DIA/DEPTH**	**N/P/Q**	**THREAD/DEPTH**	
A08920	N/A	.28" (7.0)	.87" (22.1)	N/A	.47" (12)	.225"/.225" (5.72/5.72)	.156"/.25"/.150" (4.0/6.4/3.8)	28"/.20"/2.50" (7.2/5.1/63.5)	#4-40 UNC 2A/.38 (9.6)	.6" (15)
A08922	10" (254)	.39" (9.9)	.87" (22.1)	1.38" (34.9)	.47"/.67" (12/17)	.225"/.225" (5.72/5.72)	.156"/.25"/.150" (4.0/6.4/3.8)	.28"/.20"/2.50" (7.16/5.1/63.5)	#4-40 UNC 2A/.38 (9.6)	.6"/1.2" (15)/(30)
A08923	N/A	.32" (8.1)	.87" (22.1)	N/A	.60" (15)	.187"/.187" (4.75/4.75)	.177"/.28"/.165" 4.5/7.1/4.2	.32"/100"/5.00" (8.1/25.4/127)	#6-32/.25" (6.4)	1" (25)
A08925	N/A	.39" (9.9)	.87" (22.1)	N/A	.68" (17.3)	.425"/.425' (10.80/10.80)	.250"/.50"/.300" (6.4/12.7/7.6)	.36"/.20"/5.75" (9.1/5.08/151)	#6-32 UNC2A/.38 (9.6)	1" (25)
A08926	10" (254)	.55" (13.8)	.98" (24.9)	1.50" (38.1)	.68"/.83" (17/21)	.425"/.425" (10.80/10.80)	.250"/.50"/5.00" (6.4/12.7/7.6)	.36"/.20"/5.75" (9.1/5.08/146)	#6-32 UNC 2A/.38" (9.6)	1/1.5" (25)/(38)

PANELite® Backlights



A versatile addition to the extensive line of our patented backlights

- Patented process creates diffuse, uniform† illumination within the active area.
- Slim profile to fit the most restrictive space requirements
- Same dependable performance built into three standard configurations
- Flexible panel (A23000) can create a seamless, curved background.
- When used with a curved diffuser (customer supplied), the PANELite® backlight is ideal for multiple camera inspection of cylindrical surfaces.
- PANELite® backlight, A23000 can be trimmed to final size.
- Use with strobes and ColdVision Series light sources. Other sources, particularly those without an IR filter, may damage the plastic fibers.
- All our dichroic color filters can be used on the products in conjunction with the A08931 backlight color filter adapter. More details can also be found in the Fiber Optic Accessory section of the product catalog.
- 40" (1016)* flexible fiber bundle
- Economical - works without a housing
- IR filter on every unit

Note: Uniformity Tolerances varies with size of active area. See technical specifications on reverse side.

PANELite® Backlight with adhesive back, A23000

Special Configuration

- PANELite® backlights can be manufactured with different active areas, placement of outputs and mounting hole locations. Lead time required. Call for a custom quote.

Typical Applications

- Glass inspection
- Edge detection
- Photography
- Instrumentation display

PANELite® Backlights

Dimensions in ( ) are in mm

Transmits visible light - from 400nm to 700nm
Temperature limit 0° to 70°C

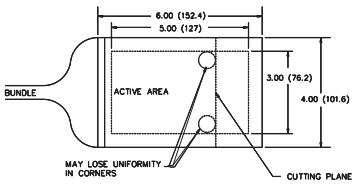
Uniformity Specification

- Area of calibration is 3"x 5" (76 x 127)
- Calibrated to ±15 gray scale levels at a mean of 200, gamma setting of 1.0
- Tested with a .118"(3mm) white acrylic plate, spaced .3" (7.6) from panel. (Call manufacturer for set up specification)

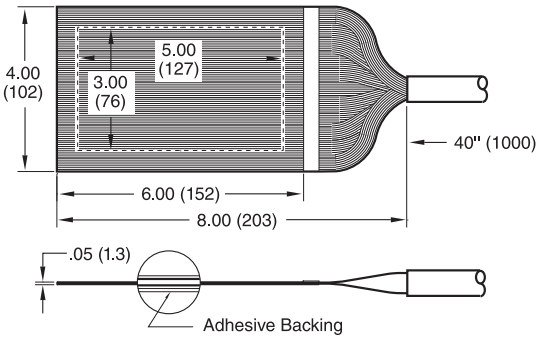
Please Note: A .3" (7.62) border does not meet this specification on panels larger than 1.5" x 1.5" (38x38). Uniformity specification for custom panels smaller than 1.5" x 1.5" (38 x 38) or larger than 4" x 6" (102 x 152) will be provided with quote.

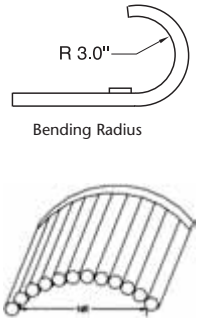
Warning : This product contains plastic fibers. To avoid fiber damage use only with **SCHOTT** or other approved light sources. Do not use input filters or diffusers without a **SCHOTT** adapter. Thermal transfer may cause damage to the fibers. All PANELite® Backlights have permanent input IR filters which must be kept clean. Clean panels with isopropanol only. OTHER SOLVENTS will damage the fiber and affect uniformity.

A23000
PANELite® Backlight



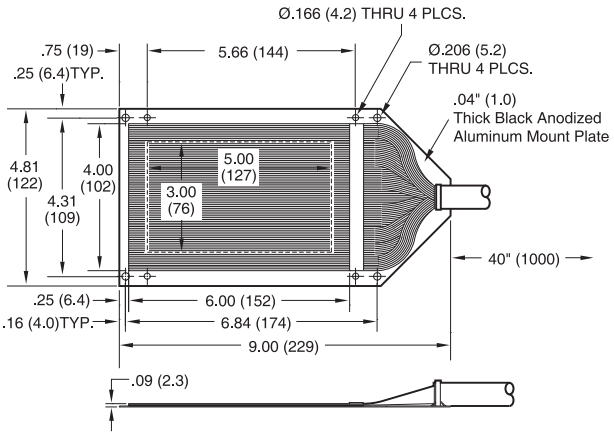
The A23000 PANELite® backlight can be trimmed in either direction with a good pair of scissors.
NOTE: Trimming affects uniformity in the corners along the trimmed edge.



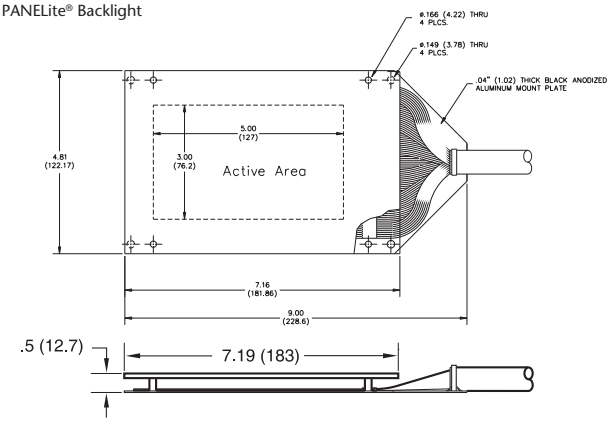


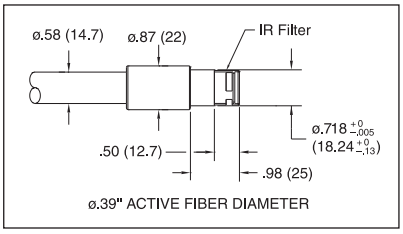
Do not bend parallel to fiber direction.

A23010
PANELite® Backlight



A23020
PANELite® Backlight





All standard PANELite® backlight configurations have the same input dimensions.

PANELite® Backlights

Part No.	Description	Calibrated Area	Panel Size	Overall Thickness
A23000	Flexible, adhesive back	3" x 5" (76 x 127)*	4" x 6" (102 x 152)	.05" (1.3)
A23010	Non-flexible, black anodized aluminum back	3" x 5" (76 x 127)	4.8" x 9" (122 x 229)	.09" (2.3)
A23020	Non-flexible, black anondized aluminum plate with acrylic diffuser plate	3" x 5" (76 x 127)	4.8" x 9" (122 x 229)	.5" (12.7)
Options				
A08931	Color filter adapter	Fits backlight light source adapters with .718" (18.2) diameter input size		

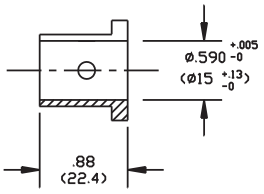
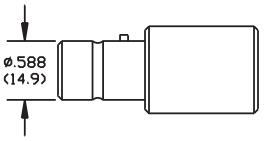
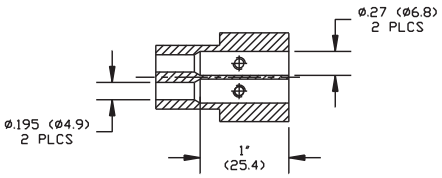
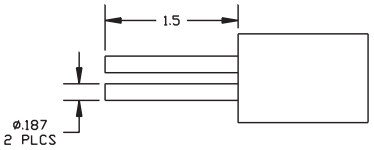
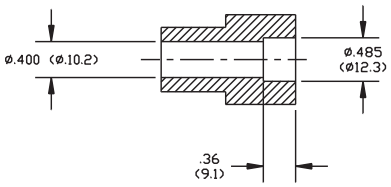
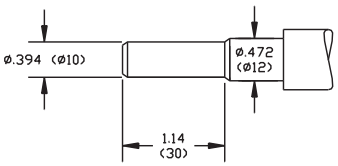
Input Adapters

For DCR® Series and ACE® Series Light Sources

SCHOTT provides a series of adapter bushings which fit into the DCR® Series and ACE® Series light sources.

The corresponding ferrule sizes they will accept, are shown below. The bushing attaches to the fiber bundle ferrule with a set screw. The bundle is then inserted into the light source receptacle. These adapters guarantee proper fiber bundle positioning in the focal plane of the lamp to receive the maximum light output.

Input Adapters

PartNumber	Adapter	Ferrule	
★ A08009			Volpi
A08010			
A08013			SCHOTT KL Series

Dimensions in ( ) are in mm

★ Made-to-order products.

Fiber Specifications

A2 Fiber

Material: Glass

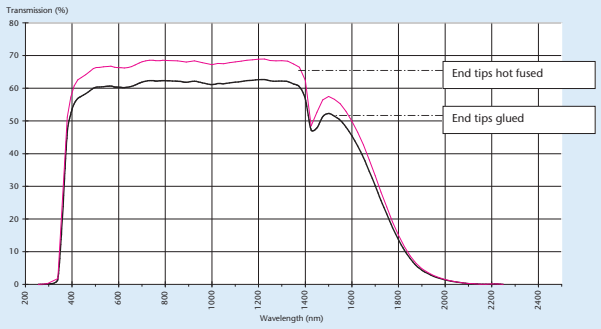
Characteristics: High transmission, performs best in the visible spectrum, large aperture angle and low color shift

Specifications:

Numerical Aperture NA:	0.64
Acceptance angle:	80°
Color temperature (D 65 illumination):	5475K
Fiber diameter (µm):	30,50,70
Bundle length (M):	≤10

Note: Longer lengths available upon request

Spectral Transmission for 1 M Bundle, Fiber Type A2



B3 Fiber

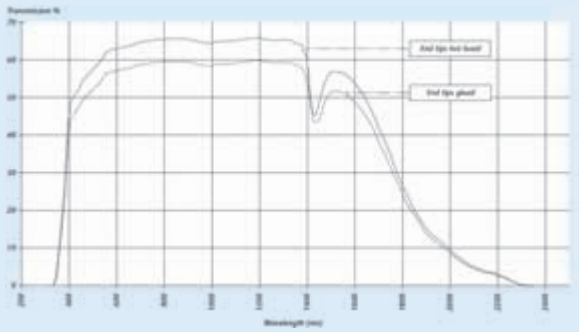
Material: Glass

Characteristics: Excellent transmission, performs best in visible spectrum, high acceptance angle and extremely colorless.

Specifications:

Numerical Aperture NA:	0.54
Acceptance angle:	65°
Color temperature (D 65 illumination) :	5870 K
Fiber diameter (µm):	30,50,70
Bundle length (M):	≤10

Spectral Transmission for 1 M Bundle, Fiber Type B3



FDS Fibers

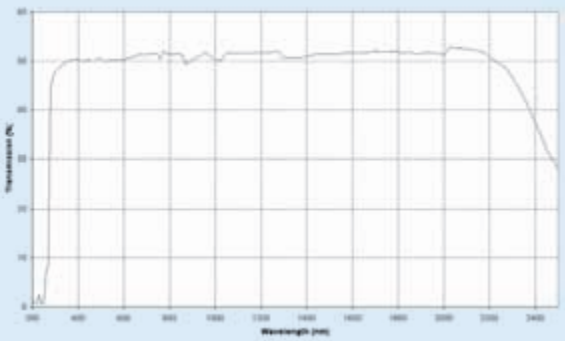
Material: Fluorine Doped Fused Silica (FDS)

Characteristics: Low OH. Performs good in UV spectrum, but better in the IR.

Specifications:

Numerical Aperture NA:	0.22 (+/-.02)
Acceptance angle:	25° (+/-2°)
Fiber diameter (µm):	240
Bundle length:	Quoted

Spectral Transmission for 1 M Bundle, Fiber Type FDS Low OH



FDS Fibers

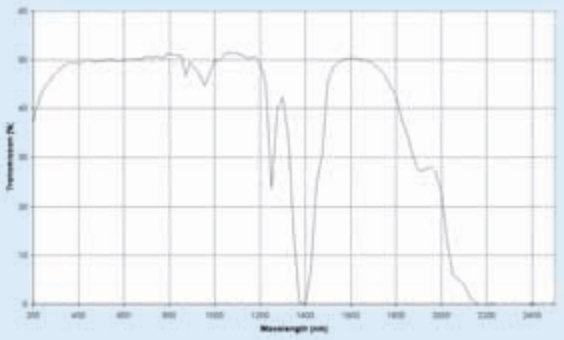
Material: Fluorine Doped Fused Silica (FDS)

Characteristics: High OH. Performs best in the UV spectrum.

Specifications:

Numerical Aperture NA:	0.22 (+/-.02)
Acceptance angle:	25° (+/-2°)
Fiber diameter (µm):	107, 240
Bundle length:	Quoted

Spectral Transmission for 1 M Bundle, Fiber Type FDS High OH



W Fiber

Material: Glass

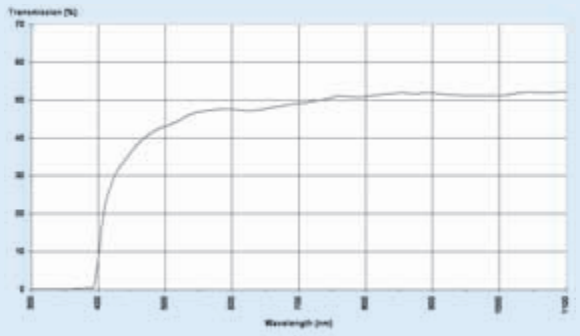
Characteristics: Used for the visible region of the spectrum when a wide aperture angle is required.

Specifications:

Numerical Aperture:	0.87
Acceptance angle:	119°
Color temperature (D 65 illumination):	4700 K
Fiber Diameter (µm):	30
Bundle length (M):	≤10

Note: Longer lengths available upon request

Spectral Transmission for 1 M Bundle, Fiber Type W



PCS Fiber

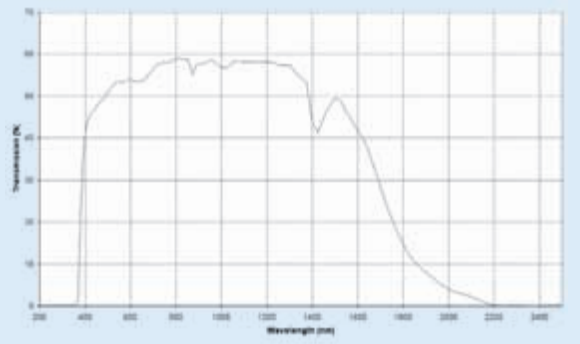
Material: Plastic Clad Silica (PCS)

Characteristics: High OH. Performs good in visible spectrum. Economic alternative to Fused Doped Silica.

Specifications:

Numerical Aperture NA:	Short Lengths (<2 M) 0.40 Long Lengths (>40 M) 0.30
Acceptance angle:	Short 47° Long 35°
Fiber diameter (µm):	275
Bundle length:	Quoted

Spectral Transmission for 1 M Bundle, Fiber Type PCS High OH



PCS Fiber

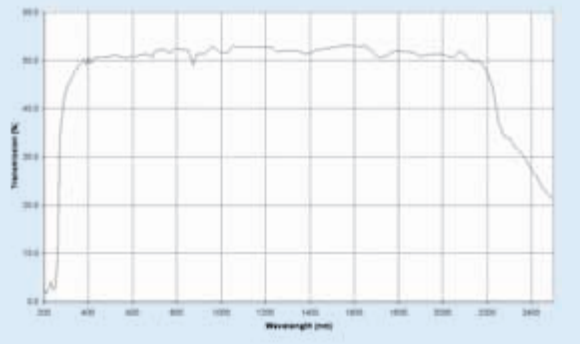
Material: Plastic Clad Silica (PCS)

Characteristics: Low OH. Performs good across UV, visible, and IR spectrum. Economic alternative to Fused Dope Silica.

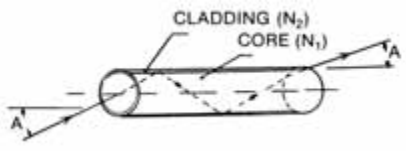
Specifications:

Numerical Aperture NA:	Short Lengths (<2 M) 0.40 Long Lengths (>40 M) 0.30
Acceptance angle:	Short 47° Long 35°
Fiber diameter (µm):	275
Bundle length:	Quoted

Spectral Transmission for 1 M Bundle, Fiber Type PCS Low OH



Fiber Characteristics



Fiber Composition

Most optical fibers consist of two different types of optically transmittive materials. The core, about 75-90% of the fiber depending on the fiber diameter, has a higher refractive index than the cladding. This creates a reflecting interface between core and cladding which keeps the light within the core due to total reflection.

Most optical fibers are made from glass, plastic or synthetic fused silica (often refered to as "quartz"). Each fiber has different properties producing various advantages. Due to their low attenuation silica fibers are commonly used in data communication. Glass is still the best choice for illumination and sensing applications, due to a reasonale cost-benefit ratio. Plastic fibers can be used for assemblies not requiring heat above 175°F/80°C. Single plastic fibers are usually larger in diameter than glass fibers, which results in restricted bending radii.

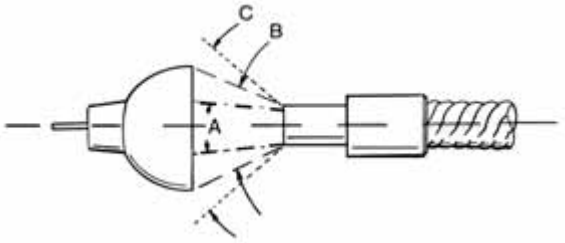
Numerical Aperture

The sketch above shows a typical fiber. The core has a refractive index of N1 and the cladding an index of N2. Light enters the fiber at angle A and is transmitted through the fiber. If the angle A is too large, the light will not be transmitted. We call the angle beyond which the light cannot be carried through the fiber the Critical Angle. This is calculated using the two refraction indices. The sine of the Critical Angle is the Numerical Aperture or NA The Acceptance Angle of the fiber is two times the Critical Angle.

$$NA = \sqrt{(N_1)^2 - (N_2)^2} \qquad f^{\#} = 1/2\ NA$$

EXAMPLE: If N1 is 1.62 and N2 is 1.52, the NA will be .56 which equals a Critical Angle of 34° and an Acceptance Angle of 68°. The f number/equivalent will be f/0.89.

Optical fibers tend to preserve the angle of incidence during the light transmission and therefore in the figure above, the angle A is shown at both the entrance and exit ends of the fiber. The sketch below shows a typical projecting lamp illuminating a fiber bundle. The angle A is the Acceptance Angle of a .25 NA fiber (29°). Angle B is the Incident Angle from the lamp and angle C is the Acceptance Angle of a .66 NA fiber (83°).



The calculated minimum NA. required for the 45° Angle of Incidence is .38. Therefore, a fiber with an NA. of .66 will accept all of the light from the lamp, but the output angle will only be 45° and not the 83° which might be expected. However, the .25 NA. fiber which cannot accept all of the light, will have an output angle of 20°. Using a low NA. fiber will not focus the light from a lamp because it can't receive any light beyond its Critical Angle and therefore has a narrow output cone. Multicomponent glass fibers typically reach NA values up to 0.9, whereas quartz silica fibers typically do not exceed 0.4 NA values.

Transmission Characteristics of Optical Fibers
High quality optical glass (crown and flint glass) is used for the light transmitting core and an optical glass with a different refractive index for the cladding. Wavelengths between 400 and 900 nm are transmitted uniformly, with only minor variations.

In this range SCHOTT's standard multicomponent glass fibers (A2, B3) have attenuation levels between 150 and 300 dB/km. Transmission in the UV range is very low and wavelengths below 350 nm are not transmitted. However, the near infrared range (0.8 µm to 1.3 µm) is transmitted very well by glass fibers. At 1.4 micron, all fibers except those specifically designed for IR transmission, show a significant drop in transmission due to OH-Absorption within the glass. In the range from 1.4 up to 2.0 µm specifically designed glass fibers for IR-transmission can be used.

For improved transmission over the entire range from 250 nm up to 3.0 µm quartz (fused silica) fibers are the best choice, but have a lower NA.

Transmission Characteristics of Optical Fiber Bundles
Although specific information on the performance of a single fiber is valuable, it is important to understand how optical fibers perform when manufactured into bundles. Due to total reflection, a portion of the light will be reflected at the polished glass surface of the fiber at the entrance as well as the exit. In addition, the interstitial gaps between the fibers, usually filled with epoxy glue, will not transmit any light. The losses due to these two effects can be estimated at appoximately 25 % -30 %, depending on the polishing quality. The loss of the interstitial gaps can be reduced by hotfusing the entrance end instead of glueing the fibers together. Thus, transmission can be increased up to 15 %. In addition, transmission loss will be caused with increasing length of the lightguide. A 3-foot/1m lightguide will transmit approximately 60% of the light emitted by the lamp towards the fiber bundle within the NA. A 10-foot/3m light guide will transmit about 55% of the light and a 30-foot/10 meter lightguide roughly of 40 %.

Uniformity of Fiber Optic Products

SCHOTT North America, Inc. manufactures two product lines which require a uniformity specification across a given area: lightlines, also referred to as spot to line converters, or cross-section transformers and backlights.

The uniformity of lightlines and backlights can be evaluated utilizing a Machine Vision System:
· CCD area scan camera
· a framegrabber card
· image analysis software.

Backlights
The backlight is placed directly under the camera at a defined distance based on the size of the active area. The camera will be focussed onto the top surface of the backlight diffuser. Then the uniformity is measured by using an area of interest (AOI) histogram. The AOI will be slightly smaller than the active area to compensate for edge fall-off. The light source used for backlight calibration is a DCR® III with an EKE lamp.

Lightlines
Lightlines smaller than 16" (406 mm) in length are mounted on a 45 degree angle fixture. The fixture has a diffuser plate which is located .5" (13 mm) above the fiber line. The line is projected onto the diffuser plate, which is positioned directly below an area scan camera. The distance from the camera to the diffuser is determined by line length but is approximately 24" (610 mm). The camera's focus is adjusted to the top surface of the diffuser. The uniformity is then measured by taking a line profile of the image. The line profile will be approximately .5"-1" (13 mm-25 mm) shorter than the product to compensate for fall-off. The light source used for lightline calibration is a DCR® III with a DDL lamp. The above information is an overview of our calibration process.

Using these set-ups, backlights and lightlines will be calibrated to predefined uniformity values. Details are provided on the individual data sheets.

Lamp Intensity versus Lamp Life

Halogen Bulbs
All SCHOTT Halogen cold light sources (including the ACE®, DCR®III, KL 1500 LCD, KL 2500 LCD and KL 200) allow the user to adjust light intensity from zero to the full rated voltage of the lamp. However, voltage to the lamp effects lamp life. As a rule of thumb, a 10% reduction in voltage of most halogen lamps increases the anticipated life time to 400%. SCHOTT recommends using the minimum intensity setting needed to maximize the life of the lamp.

The Halogen Cycle is the operating principle of all Quartz Halogen lamps. At full voltage, the temperature of the glass envelope is hot enough to keep evaporated tungsten (thrown off from the filament) from collecting on the glass surface. The tungsten is cycled back to the filament and thus increases its lifetime. As voltage is reduced, the temperature of the glass envelope also decreases, which might effect the halogen cycle. For this reason the lamp life might not be increased as expected when the voltage is dimmed below 75%.

All types of quartz Halogen bulbs used in SCHOTT cold light sources (DDL, EKE, EJA, EFR and ELC) operate in the same manner.

Quartz UV Light Guides

Our Quartz fiber light guides are ideal for light transmission and high-power spot curing in combination with a UV light source.

Because we control the entire production process from fiber drawing to final assembly, we can not only offer an assortment of standard products, but also a multitude of custom solutions ranging in shapes, branches, lengths and diameters. Depending on the application, we can adapt and meet many different requirements.

Quartz Fiber Light Guide Applications

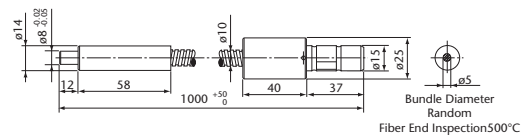
- UV Curing
- Florescence Analysis
- Lighting in Vacuum & Special Environments
- Specialized Medical Illumination
- LCD & Semiconductor Lithography

Quartz UV Light Guide

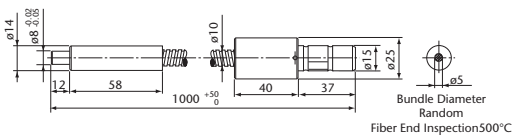
- MORITEX draws raw quartz fibers, processes, and bundles them according to application.
- Straight, multi-branch, and other various configurations of light guides can be manufactured including light guides made to customer specifications.

	Model	Notes	Product Code
Standard Model	**MSS5- 1000S-UV III**	ø5×1000L	A-1260
	MWS5- 1000S-UV III	ø5 x 2-Branch x 1000L	A-1261
	M4S5- 1000S-UV III	ø5 x 4-Branch x 1000L	A-1262
Made-to-order	**MSS3.5- 1000S-UV III**	ø3.5×1000L	A-1263
	MWS3.5- 1000S-UV III	ø3.5 x 2-Branch x 1000L	A-1264
	M3S3.5- 1000S-UV III	ø3.5 x 3-Branch x 1000L	A-1265
	M4S3.5- 1000S-UV III	ø3.5 x 4-Branch x 1000L	A-1266
	MSS10- 1000S-UV III	ø10×1000L	A-1267
	MKS50- 1000S-UV III	Line Width: 50mm	A-1268
	MKS50×0.4W- 1000S-UV III	Line Width: 50mm x 0.4mm (2-Branch Type)	A-1269

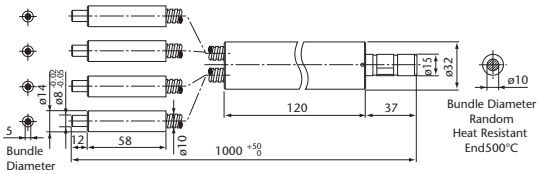
MSS5-1000S-UV III



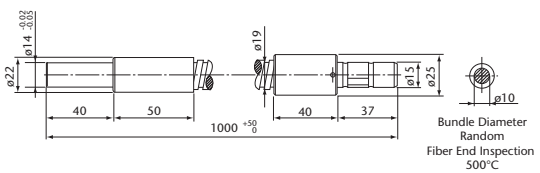
MWS5-1000S-UV III



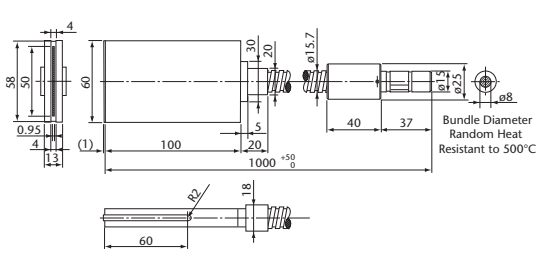
M4S5-1000S-UV III



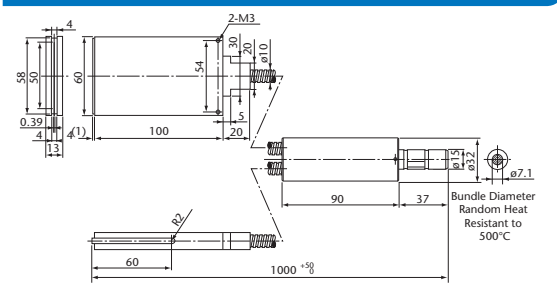
MSS10-1000S-UV III



MKS50-1000S-UV III

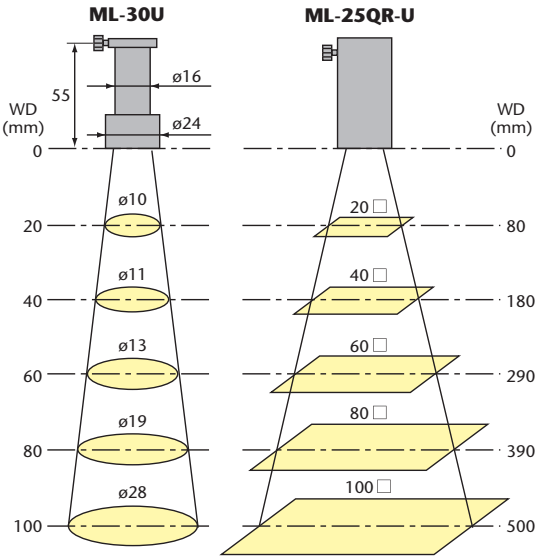


MKS50x0.4W-1000S-UV III



Quartz UV Light Guide Options

Unit for Condenser Lenses



Model	Notes	Product Code
ML-30U	Condenser Lenses	A-8590
ML-25QR-U	Uniform Light Irradiate Quartz Lens	A-8591

Quartz UV Light Guide Data

UV Visible Range Quartz Fiber Characteristics

Optical Fiber Data

NA and Stucture Dimensions	NA		0.22±0.02
	Diameter	Core(μm)	200±3
		Clad(μm)	208±3
		Primary Coating (μm)	240±10
	Permissable Bend Radius (mm)		20
Materials	Core		Pure SiO^2
	Clad		With F SiO^2

Note: Fiber diameter (core/ clad) may be changed without any notice.

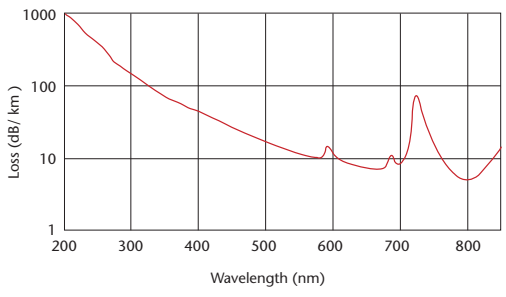
Features

- Suitable for UV-ray transmission because of high OH contents
- Prices are low because of rational production system.
- Transmittance rate is stable for a long time when used for UV light guides.
- Can be used for i, g, and h rays
- The thorough quality control of transmission performance and dimensional precision realizes easy processing with less dispersion and produces good-quality products.
- The technology, experience, and know-how of MORITEX, accumulated over a long period enables various fiber processing.

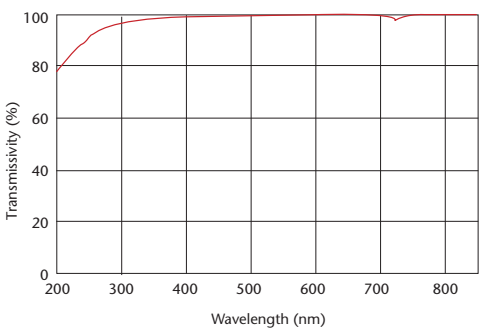
Applications

- Light guides for UV spot light sources
- Advanced light guides for semiconductors and liquid crystal exposure devices
- Light guides for analyzers
- Fiber probes for sensors
- Light guides for fluorometric analysis
- Light guides for medical use

Wavelength Loss Characteristics



Wavelength Transmittance Rate Characteristics (Per Meter Excluding Fresnel Reflection)



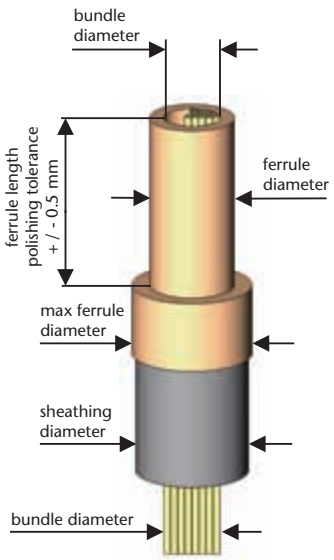
Special Application Light Guides

We offer the following choices for the light guide end termination:

Epoxy End Termination:

Standard temperature resistance up to 200°C depending on application

High Temperature resistance up to 300°C on request



Epoxy Process

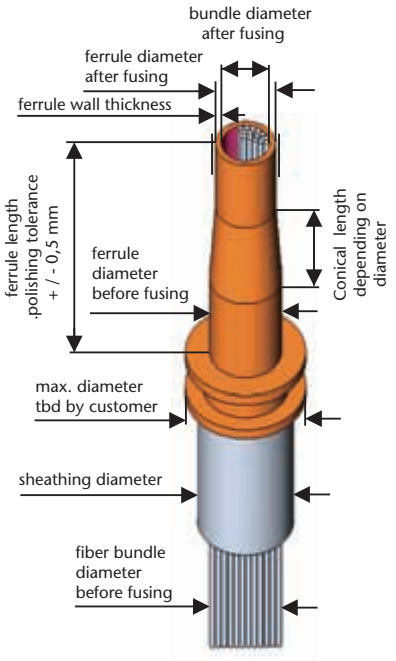
Note: Transmission of glued bundle is approximately 10 % lower than the fused bundle with same diameter after fusing.

*Note: All dimensions in the drawings depend on the bundle diameter

Fused Fiber Bundle Termination:

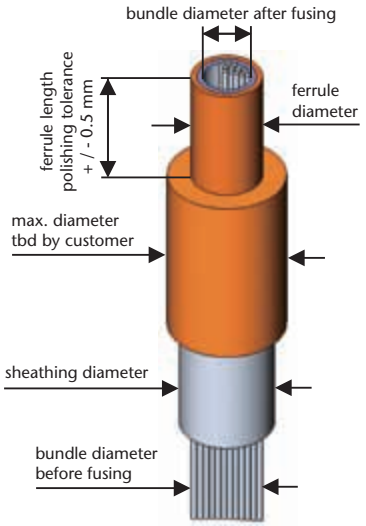
The end face of these light guides have a temperature resistance up to 350°C and approximately 10 % higher transmission values than epoxied fibre bundles with the same bundle diameter

Hot Forming
Diameter range 2.5 – 21.0 mm after fusing


bundle diameter after fusing
ferrule diameter after fusing
ferrule wall thickness
ferrule length polishing tolerance + / - 0,5 mm
ferrule diameter before fusing
Conical length depending on diameter
max. diameter tbd by customer
sheathing diameter
fiber bundle diameter before fusing

Hot Forming Process

Hot Fusing (on request)
Diameter values 4.0 and 4.7mm after fusing


bundle diameter after fusing
ferrule length polishing tolerance + / - 0.5 mm
ferrule diameter
max. diameter tbd by customer
sheathing diameter
bundle diameter before fusing

Hot Fusing Process

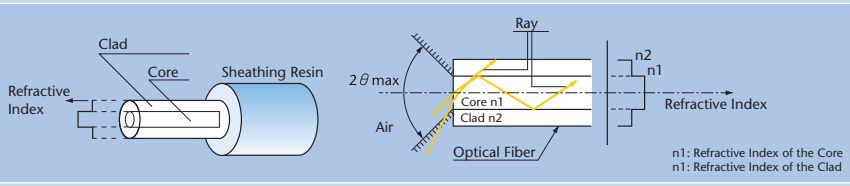
Sheathings:

Stainless steel, metal / PVC or metal / silicone sheathings, other sheathings on request

Fiber diameter values:
50 µm and 70 µm

Special applications:
Temperature resistance at the proximal end of up to 500°C can be achieved using quartz fibres and a special epoxy

Glossary

Measured Light Quantity	**Light Flux (lm)**	The quality of light emitted from a light source. The unit is lumen (lm)
	luminous Intensity (cd=lm/sr)	Light source quantity representing the quantity of light emitted from a light source per unit solid angle. The unit is candela (cd) = lm/ sr (solid angle)
	Intensity (lx=lm/m²)	Brightness on an object surface irradiated by light emitted from a light source. The unit is lux (lx) = lm/ m² where m² is the area of the object surface
	Illuminance (nt=cd/m²)	Light source quantity representing the luminous intensity of light emitted from a light source per unit area. The unit is nit (nit) = cd/m² or stilb = cd/ cm²
Filter	**Color Temperature K**	Color temperature representing the spectral energy distribution of light emitted from a light source. The unit is kelvin (k). A light source of a low value is reddish and one of a high value is bluish. To change the color temperature of a light source, use a color temperature conversion filter.
	Polarizing Filter	A filter to block light being reflected from glass, metal, or liquid surfaces that is too strong and detrimental .
	ND Filter	A filter to reduce the light quantity only, without affecting color reproduction. Also known as a gray filter.
	Color Temperature Conversion Filter	A filter to change the color temperature. The wavelength can be selected.
	Diffusion Filter	A filter to diffuse light from a light source and suppress illumination irregularity.
	IR Cut Filter	This filter can be classified into two types: heat-ray absorbing filters (or, catathermic filters), which absorb infrared rays, and cold filters, which reflect infrared rays by a multilayer film.
	Light Control Film	By laminating a micro-louver film with PET or other types of film, diffused light becomes more parallel.
Lamp	**Halogen Lamp**	An incandescent lamp with a trace of halogen gas added to the sealed gas. The halogen cycle prevents the blackening of the bulb wall. The optical output and color temperature are stable with less attenuation compared with that of an ordinary incandescent.
	Metal Halide Lamp	A lamp of great color rendering and high intensity using illumination by various metal halogen compounds and mercury.
	LED	A Light Emitting Diode (LED) is a semi-conductor element that applys a fixed-direction current to a crystalline substance with a semi-conductor PN junction, generating energy in the substance and emitting the energy as light. The basic theory was found early in the 20th century and silicon carbide was confirmed, experimentally, to emit light if a current was applied. Following this research, the current technology was established in the 1960's. Red and green were developed first, yellow in the 1970's, blue in 1993 and white in 1996.
	Constant-Current Power Supply	A power supply that can supply a fixed current even if infinite impedance and load voltage change.
	Constant-Voltage Power Supply	A power supply that can supply a fixed voltage even if 0 impedance and load voltage change.
	Resistance	Resistance (R) represents the difficulty of a current to pass: R = V/I. The unit is ohm (Ω). If the potential of a current drops by 1 volt (V) per ampere (A), the resistance is 1Ω.
Fiber	**Optical Fiber**	
	Numerical Aperture NA	The characteristic of receiving rays transmitted through the end face of an optical fiber. This is determined by the refractive indexes of the core and clad of the optical fiber. $NA=\sqrt{n_1^2-n_2^2}$
	Light-Reception Angle θ	An angle where the optical fiber can receive light. $\theta=2\sin^{-1}(NA)$

Catalog Icon Key

CE

The CE marking (CE mark) is a mandatory conformity mark on many products placed on the single market in the European Economic Area (EEA). The CE marking certifies that a product has met EU consumer safety, health or environmental requirements.

UL

To comply with fire/safety codes, products sold in the United States should be certified to comply with the requirements set by OSHA. A well-known company providing this service in the United States is UL (Underwriters Laboratories®). The UL Mark on a product means that UL has tested and evaluated programs, product and manufacturing facility and they meet UL requirements. The UL Marks may be only used on or in connection with products certified by UL. In addition to these marks, UL also provides access to the marks required in a number of other world markets. There are many types of UL Marks, each with its own specific meaning.

CSA

CSA is a Canadian counterpart of UL, given permission by OSHA to test and certify to OSHA safety standards.

RoHS

Restriction of Hazardous Substances Directive (RoHS). The Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2002/95/EC was adopted in February 2003 by the European Union. The RoHS directive took effect on 1 July 2006, and is required to be enforced and become law in each member state. This directive restricts the use of six hazardous materials in the manufacture of various types of electronic and electrical equipment.

IP67

IP (Ingress Protection) is a set of standard measurements related to the protection of products from solid foreign objects and water. IP is prescribed by the Japanese Industrial Standards Committee (JISC0920) and the International Organization for Standardization (IEC60529).
IP67 is a level of protection that can withstand being submerged in water at a depth of 1 meter for 30 minutes.

50 W 75 W 100 W 150 W

Indicates Wattage i.e. 50 W = 50 Watt

Analog Digital Digi Ana

External intensity control type - Analog = 0-5 V, Digital = 8 bit or 10 bit
Digi/Ana type has both of Analog and Digital control.

1ch 2ch 3ch 4ch

The number of channels for output power
i.e. 1 ch = 1 channel output, 2 ch = 2 channel output

W W (R/G/B)

LED color
W = White, R = Red, G = Green, B = Blue, (R/G/B) = Made-to-order

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